ASL

Australian Society
for Limnology Inc

NEWSLETTER

Volume 36 Number 2

June 1998

Registered by Australia Post

Print Post Publication No. PP381667/00125

ISSN 1037-2512

AUSTRALIAN SOCIETY FOR LIMNOLOGY INC.

The Australian Society for Limnology (ASL) is an Australian-based scientific society whose focus is the study and management of inland waters. The ASL was established in 1961, and has a current membership of over 500 researchers, managers, engineers, teachers and tertiary level students from all states and territories. Members have a strong professional interest in inland aquatic issues, including the maintenance of biodiversity, the maintenance and/or restoration of water quality, and the wise use of aquatic resources. The Society also has a strong interest in fostering the scientific and intellectual development of tertiary students.

The Society includes members working in government agencies, tertiary institutions and many industries related to aquatic resources. Through their daily activities, members have contact with local communities and are in a sound position to interpret and advise on inland water issues. The Society has a substantial knowledge base, and has assumed a responsibility to ensure that this is available to those who manage inland waters.

Accordingly, the charter of the ASL is to further our understanding of Australia's inland waters and to promote their wise use and sustainable management. In this manner we will contribute to the continued existence of this valued resource and the maintenance and enhancement of the quality of life for all Australians.

The ASL regularly produces a newsletter with notes on limnological activities, articles of interest, book reviews and announcements of upcoming events likely to be of interest to Members.

EXECUTIVE OFFICERS 1997-98

President
Dr Pierre Horwitz,
Centre for Ecosystem Management, Edith Cowan University, Joondalup, WA 6027.
Ph: 08-9400 5558, Fax 08-9400 5717 Email: p.horwitz@cowan.edu.au;

Vice-President
Dr Jane Chambers
Environmental Science, Murdoch University, Murdoch WA 6150
Ph: 08-9360 2739 Fax: 08-9310 4997 Email: chambers@essun1.murdoch.edu.au

Immediate Past President
Dr Max Finlayson, ERISS, Locked Bag 2, Jabiru, NT 0886
Ph: 08-8979 9756 Fax: 08-8979 2149 Email: maxf@eriss.erin.gov.au

Secretary
Dr Richard Marchant, Museum of Victoria, 71 Victoria Cresent, Abbotsford, VIC 3067.
Ph: 03-9284 0218. Fax 03-9416 0475. Email: rmarch@mov.vic.gov.au.

Treasurer/Membership Officer
Mrs Margaret Hart, 22 Netherby Avenue, Mulgrave, VIC 3170.
Ph: 03-9560 4406. Fax: 03-9560 4406 Email: m.hart@sci.monash.edu.au

Membership Infomation and a list of the Regional Executive Officers can be found at the back of this Newsletter

CONTENTS

Contents 1
Editorial 2
Deadlines for the Newsletter in 1998/99 2
From the President 3
Prattlebut, Scumour and Ruttle 4
60 Minutes 10
Congress 1998 11
1998 AGM 14
Financial Statement 17
Australian Society for Limnology Medal 23
Call for Nominations 23
Announcements 27
Field Laboratory-Arnhemland Northern Australia- 27
Marine & Freshwater Research Special Offer 28
Postcard from the Sedge 29
Printemp en Camargue/Spring in the Camargue 29
ASL Issues 31
Articles 42
Australian Science - Drifting or Sinking? 42
GST and Scientific Research 45
News from FASTS 47
New Books 53
Conference Reports 54
Conference Capers 55
ASL Volunteers 58
Bibliography 60
Regional Executive Members 1998-99 63
Editorial Address 63

Material for publication in the September Issue of the Newsletter should be sent to the Editor (see back pages) before 31st October 1998.

Long articles should be forwarded as unformatted text on a disk or via email.

ASL Home Page
http://www.ntu/edu/au/science/mdouglas/asl_home.html

This Newsletter is printed by ETU Publications, The University of Adelaide

EDITORIAL

NEW NEWSLETTER EDITOR FOUND!!

ASL now has a NEW Newlsetter Editor. Dr Ivor Growns will take over the job for either the December 1998 or March 1999 Issue. Thankyou Ivor!! The new editorial address will be provided in the next issue.

Thanks Gary Jones and your team of helpers for a great conference at Ivory Rock in July. Included in this issue are a number of items from that conference - Max Finlayson's 97/98 Presidents Report, the regulations and a call for nominations of the new Australian Society for Limnology Medal, minutes of the AGM and some photos. The next issue will contain the Door Prize Report and the Student Prize report and the reportees appear to be absent (sampling beer in Irish Pubs I fear!!). Also included in this newsletter are a number of items under the 'ASL Issues' heading including the recently released Dryland Rivers Policy Document, the ASL Future document and the new ASL Charter.

Happy reading.....

DEADLINES FOR THE NEWSLETTER IN 1998/99

The following are the deadlines for the remaining issues of ASL Newsletter Volume 36 and for issues of Volume 37.

Volume	Deadline
Volume 36	
September 1998, *No. 3*	30th October 1998
December 1998, *No. 4*	31st December 1998
Volume 37	
March 1999, *No. 1*	31st March 1999
June 1999, *No. 2*	30th June 1999
September 1999, *No. 3*	30th September 1999
December 1999, *No. 4*	31st December 1999

FROM THE PRESIDENT

98/99 PRESIDENTS INAUGURAL REPORT!

No need to muck around here, just a quick note with a few messages.

Firstly, you should find within these pages the new regulations for the new ASL award, the Australian Society for Limnology Medal (commemorating Hilary Jolly), and a call for nominations. The changes occurred as a result of a process involving consultation with, and participation by, members of the Society. No doubt you will notice that the criteria for making the award have been more clearly articulated, and broadened somewhat.

ASL has produced its second policy document (on Dryland Rivers) thanks to the fine work of Kerri Muller *et al.*, and other policy documents are in the pipeline. By the time you read this we should have established a working group to put together a policy document on carp (which will be coordinated by Dr Jane Roberts). We are also establishing a working group for urban streams and urban wetlands (with Prof Bill Williams coordinating). Ideally these policy documents will be circulated in draft form (perhaps through the email discussion group) to get broad-based comment before receiving the Society's ascent. Also, I have approached the President of the Ecological Society of Australia (Dr Richard Hobbs) to see whether we can cross-endorse policy documents which are relevant to both Societies; I'll keep you posted on this one.

I should acknowledge that the concept of the newsletter received rousing support both from the email discussion list, and from the AGM in Queensland, support which will ensure that a newsletter of hardcopy form will persist into the relatively distant future. Having said that, we MAY need to go to an OPTION of providing the newsletter electronically (but only to those who wish to receive it that way).

We have been extremely fortunate to have had the services of Dr Fran Sheldon as our Newsletter Editor, for about as long as I can remember, and on behalf of the Society I offer a huge thankyou to Fran and her team of helpers.

Finally, can I encourage everyone to register on the email discussion list if they have access to email (that is, if you haven't already done so).

I'll get out of your way and let you read the mag.

Pierre Horwitz (ASL President 98/99)
Joondalup, 14th August 1998.

PRATTLEBUT, SCUMOUR AND RUTTLE

NORTHERN TERRITORY

Department of Lands, Planning & Environment

from: Simon Townsend

Water Resources Division has two new staff. In May, **Naomi Rae** commenced work. Previously she had worked with the CSIRO *Mimosa pigra* project, and prior to this the N.S.W. Department of Water Resources. **Naomi's** expertise lie in wetland ecology and plants. She will be working on a Natural Heritage Trust project to develop a methodology to determine environmental flow requirement. The work will be applied to the Douglas River catchment, about 250 km SW of Darwin. This river is in near pristine condition, relative to southern rivers, with no significant flow regulation. Unlike many Australian rivers, those in the NT are (at the moment) unregulated, though numerous dam sites have been identified.

Sue Bellette is the new N.T. Waterwatch Facilitator. She moved to Darwin, 18 months ago, from Adelaide with her husband. In Adelaide, she was Landcare Coordinator for the Save the Bush project. Sue is still settling into the job, and is yet to meet all the Waterwatch coordinators. In July she will be attending the National Waterwatch conference.

Lynne Powell is now working in the Environment Protection Division (of the Department) as the Coastal and Marine Assessments Officer. A contentious public issue here is the development of Darwin Harbour's foreshores, in particular the loss of mangroves, and disturbance of mangrove muds and production of acidic waters.

Lynne and Simon Townsend have been awarded their Ph Ds. **Lynne** braved the Antarctic cold to undertake a project on the ecology and taxonomy of cyanobacteria in saltwater lakes in the Vestfold Hills (Davis Station). Coincidently, **Simon** wintered a few years before Lynne at Davis Station, and commenced his thesis (part-time enrolment) - the comparative limnology of two tropical reservoirs - shortly after returning to Darwin. Both are now adjusting to a new life, without the joy (or is it burden) of a thesis to write.

Monitoring River Health field work is about to start up again. **Jane Suggitt** and **Cyrus Edwards**, supported by **Keith Ferdinands, Unice Astondoa, Karen Sutcliffe, Ross Evans** and **Damien Smith** are preparing for the next round which will target rivers potentially impacted by urban and rural activities.

Armando Padovan has been tackling Darwin stormwater issues. Water quality from industrial and urban runoff carries high concentrations of sediment, metals, nutrients and some pesticides. But what impact does stormwater have on the marine and tidal biology of the Darwin Harbour, in particular the mangroves and the receiving water? Any answers? - **Simon, Armando** and **Lynne** would be interested in discussing this.

The Centre for Tropical Wetland Management – Northern Territory University

From Michael Douglas

The CTWM is organising a workshop on indigenous use of wetlands and has had lots of interest from groups ranging from the Kimberley to Cape York. The program is rapidly filling and may extend to a third day. The aim of the workshop will be to provide a forum to discuss past current and future indigenous use of wetlands in northern Australia. This will be the first in a series of wetland workshops with the next one likely to focus on wetland weeds.

NTU is happy to welcome Dr. **Peter Whitehead** who has joined NTU as a Senior Research Fellow from PWCNT. **Peter** completed a PhD on Magpie Geese and plans to continue his research on wetlands management and wildlife conservation.

ERISS and the CTWM have run another successful coursework masters unit on Tropical Wetlands Management. The unit runs over a two week period and is based at ERISS in Jabiru, taking the sights and scenes of Kakadu.

Alison Pouliot, has made a brief return to NTU. After a few weeks of sailing around the NT coast, she was, understandably craving a few weeks of serious sample sorting. We have been happy to oblige.

VICTORIA

Monash University, Clayton

From Simon Treadwell and Natalie Lloyd

Simon Treadwell has finally got a method working for measuring the community metabolism of biofilm growing on snags and is now trying to get enough data to save his PhD before the money runs out. **Kyla Finlay** is spending most of her time at the microscope revising the taxonomy of southeast Australian mayflies. Lately, however, this has been punctuated by long bouts of preparing a seminar and paper for presentation at the IX International Conference on Ephemeroptera to be held in Argentina in August.

Edward Tsyrlin is finishing up his work on Leptoperla stoneflies and is in the middle of preparing a key to the nymphs of Riekoperla. He is also spending his time revisiting his childhood and drawings pictures of insects and is preparing a poster for the International Symposium on Plecoptera, also held in Argentina in August. **Natalie Lloyd** can see the end of microscope work and is looking forward to writing her results up.

Two new comers to Monash are **Clay Runck** and **Fred Govedich. Clay** and the Dean of Science, **Ron Davies**, are studying the ecophysiology and ecotoxicology of the shrimp, *Paratya australiensis*, and are aiming to use this species as a model species for a bioenergetic assay to asses effects of ecological condition in freshwater ecosystems. Fred is currently working on the taxonomy and systematics of leeches (Hirudinoidea). This includes reconstructing the phylogenetic relationships of this group, producing a key to the Australian species and describing any new species.

From Alena Glaister

In 1998 **Sam Lake** commenced a new project with the CRC for Freshwater Ecology in collaboration with CRC for Catchment Hydrology and Granite Creeks Landcare Group. The study involves assessing stream restoration measures undertaken on creeks in the Strathbogie Ranges, 180km north-east of Melbourne. The research team consists of **Sam, Alena Glaister, Barbara Downes, Jennifer Davis** and **Brian Finlayson.** In January **Bruno David,** working on a summer scholarship, with assistance from **Leanne Matheson** and **Alena,** surveyed the introduced and native fish species in Creightons, Castle and Nine Mile Creek using an electrofisher. This study was repeated in June to gauge seasonal differences in the fish fauna between periods of low and moderate stream flow. Initial macroinvertebrate sampling took place in summer, however sampling begins in earnest in September, at 30 sites on 5

streams including both sand and clay bed sections. For 3 months we were very lucky to have a volunteer, **Courtney Page,** who worked equally well both in the lab and in the field assisting with the fish survey. Courtney has now returned to Hamilton, Ontario, Canada where she (and her husband Nathan) will commence their Honours year.

Sam Lake attended the NABS conference at Charlottetown, Prince Edward Island and presented a Plenary Address about "Disturbance, Patchiness and Diversity in Streams". **Sam,** together with **Robyn Bevitt, Wayne Erskine, Graham Gillespie, John Harris, Brett Miners** and **Ian Varley** were asked to devise environmental flow allocations for regulated rivers in the Snowy Mountains Hydro-electric Scheme. In May a report was produced for the NSW Dept. of Land and Water Conservation: "Expert Panel Environmental Flow Assessment of Various rivers Affected by the Snowy Mountains Scheme". **Sam** and **Rhonda Butcher** are part of the Ecological Design Team for ID&A Consultants working on the Morwell River Diversion Project.

Maria Vazquez handed her PhD thesis in May 1998, and we all felt deeply their sighs of relief. **Jim Thomson** will follow suit in a few months and **Sabine Schreiber** will commence writing up any moment now. **Rhonda Butcher** yearns to be anywhere within sight of the end of sorting her samples, however in the meantime she produced a terrific talk which earned her the Student Prize at the 1998 ASL Congress. **Rhonda** is actually going to take a 3 month break from her sample processing to work for the Department; to start designing a Graduate Diploma in Freshwater Science. **Alison King,** co-supervised by **Paul Humphries** and **Sam,** continues with her work on the ecology of larval fish in lowland rivers. **Bruno** has moved to the University of Otago, Dunedin, New Zealand to commence a PhD with **Gerry Closs.** The initial project encompasses a study of the community structure and habitat use of fish species in coastal streams. Later **Bruno** plans to focus on the Giant Kokopu, its habitat use and diet in the presence and absence of trout.

New honours students include **Kylie Swingler,** supervised by Sam, will be studying "the effective disturbance on macroinvertebrates and the role of refugia in a Victorian sandy creek".

Lien Sim, under the joint supervision of **Sam** and **Jon Beardall,** will look at Myriophyllum and the allelopathic interactions between a macrophyte and phytoplankton.

WES/AWT Victoria

From Nick Souter and Phil Mitchell

Goulburn Murray Water have been keeping the staff busy over the past few months with the Lake Mokoan Restoration project. **Nick Souter, Sam Hannon** and **Michael Shirley** tried to investigate the effects of blue-green algal blooms on the ecology of Lake Mokoan's fish. However for the first time in 9 years there wasn't a late season bloom. So they had to settle for baseline data on seasonal patterns of thermal and dissolved oxygen stratification and fish diversity and abundance, and movement within the lake. Movement of fish out of the lake was also documented as during the second of two trips the lake was so saturated with poachers, not only was it difficult to find somewhere to fish, finding a car park was difficult. It turns out that the poachers were setting long lines up to 2 km in length. When we return during a bloom we should find it easier to get a park as one of the poachers drowned and two others will be wearing nice suits with arrows on them for a couple of years.

Kylie Lewin, Jodie Halliwell and **Clare Putt** were excellently supervised by Goulburn Murray Water's Anthony Lee when planting native aquatic species for revegetation trials at Lake Mokoan. **Nick Souter** has finished the first version of a Lake Mokoan GIS-based bathymetry model generated using original survey data. In between doing this Nick has been dissolving hydrobiid snail shells with concentrated HCL, before taking dry weight of the soft parts, an excuse for wearing a lab coat and rubber gloves, or part of Vin Pettigrove's urban platypus food study? Who's to say?

Alistair Cameron and **Danny Vertessy** have been continuing on with their assessment of environmental flows for the Wimmera and Glenelg Rivers and have begun an assessment of environmental flows in Diamond Creek. **Danny** has also grown an amusing moustache, whilst he looks the part he has yet to show up in any contemporary adult cinema that we know of. **Alistair** and **Rod Hardwick** will shortly venture up to Sydney to eradicate carp from the Botany wetlands. **Rod** is finishing a Streamwatch report for Melbourne Water, comprising two years of RBA macroinvertebrate data collected from Melbourne's urban waterways. **Rod** and **Michael Shirley** have responded quickly to Lake Dartmouth undergoing somewhat of a limnological crisis. Low water levels and high winter inflow have forced the lake to 'turn over' and rather than the surface being an attractive blue it is now green-brown bottom water, come up to remind us what wonderful things dams really are. Dissolved oxygen profiles were taken and fish caught.

Phil Mitchell did a hamstring striving for his state, at the Waterwatch conference, touch football state of origin competition, in Adelaide. The wounded warrior tells us Victoria made the grand final but can't remember the

result as playing on in pain blacked out his memory. While at work, Phil continues working on the Murray and Torrumbarry Weir and Mitta Mitta River monitoring. **Garry Bennison** is moving himself and family up to Queensland in early October to set up the AWT Brisbane office. Major storages work rolls on with **Catherine Sandercock, Clare Putt** and **Sam Hannon** working hard on analysis and reports (unfortunately fewer BGA blooms last summer somehow didn't equate to less work this winter); work is also underway on storage management strategy and storage management plan development. **Kumar Eliezer** continues monitoring algae for MDBC and Melbourne's major storages.

60 MINUTES

ASL Executive Committee Meeting,
3 July 1998,
Ivory Rocks Conference Centre,
Qld.

Present: D.Hamilton, F.Sheldon, K.Muller, P.Horwitz, M.Hart, M.Finlayson, R.Marchant.

1. Newsletter editor: Ivor Growns has agreed to take over as editor. Possibly 2 large rather than 4 small issues per year will be produced but this decision will be for Ivor and the executive to decide. It was suggested that it might be worthwhile to have a book review editor as well. Ephemeral news should be put on the list server.
2. Futures document: this has been circulated to members as has the arid rivers policy . Future policy documents will concern urban streams and constructed wetlands. It was also suggested that the ASL should collaborate with the Ecological Society of Australia to produce a document about criteria for deciding the scientific credibility of government processes.
3. ASL charter: some comments had been received suggesting more emphasis on student participation in the society.
4. Jolly award: P.Horwitz will present to the AGM the steps taken in arriving at a revised set of regulations for this award.
5. Next congress: I.Boothroyd from NZ will speak at the AGM about a joint congress in NZ with the NZ Limnological Society.
6. Running congresses: M.Hart suggested that the ASL executive needs more control over the financing of congresses. Budgets should be produced by the organisers and approved by the executive; documentation of financial matters should be sent to the executive. This procedure should avoid unexpected bills arriving after the congress.
7. Current congress: G.Jones indicated that he thought the congress would break even, based on the number of people attending and the amount of sponsorship he had received.

ASL Executive Meeting,
Ivory Rocks Conference Centre,
6 July 1998.

Present: R.Marchant, P.Horwitz, M.Hart, J.Chambers, G.Jones, R.Butcher, J.Jackson

1. B.Williams and K.James have expressed an interest in the next policy documents on urban streams and constructed wetlands. Policy documents could be more widely dispersed if the ASL used a mailing list from Streamline, CSIRO Land & Water or the CRC for Freshwater Ecology.
2. P.Horwitz wants to set up an ASL Medal Committee quickly so that an award can be made at the next congress.
3. The secretary will send out a list of the new executive, including email addresses, phone and fax numbers, to executive members.
4. G.Jones will revise the conference guidelines in the light of his experience and send this to the executive for approval.

CONGRESS 1998

PRESIDENT'S REPORT

37TH ANNUAL CONGRESS
IVORY ROCK, QUEENSLAND, 3-6 JULY 1998

It is only 9 months since the 36th Annual Congress in Albury where I was pleased to accept nomination for a second term as President of the Australian Society for Limnology. In that 9 months a lot has happened, much of it associated with the document "The Future of ASL" which you accepted during the AGM held during that Congress. This report summarises those activities and will serve as the basis of my report to the current AGM.

1. **The Futures Document**

This document received overwhelming support at the 36th AGM. Some of the comments that followed the AGM were interesting - Why has it taken so long to accept these ideas? What was the fuss about? OK, but who will do it? Nothing will change anyway! Only the latter worries me. It worries me as I firmly believe that for ASL to continue to be a relevant and meaningful scientific society we need to address and progress the points raised in the document. It also worries me as an individual scientist who is funded by the public purse - we need to demonstrate not just responsibility but also accountability to the public who fund many of us. If you do not share these sentiments then I strongly urge you to voice them in the continuing coherent debate about the Future of ASL. You can also choose to leave, but that is not my wish.

As a reminder, the Futures document covers the following major points:

- Raising the profile of ASL with governmental policy maker and advisory panels etc
- Dealing with external requests for the provision of advice on limnological issues
- Providing interactive fora to debate limnological issues
- Releasing policy statements on selected issues
- Maintaining the current strengths of ASL

The Futures document has been circulated in the Newsletter and on the Listserver. An attractive hard copy is also available and has been distributed with your Congress documents.

2. **Policy Statements**

Following the release of the ASL Wetlands Policy Statement in time for the Sixth Conference of the Contracting Parties to the Ramsar Convention in 1996 we have released a further statement on Dry Land Wetlands. This was done by a small group and their efforts are greatly appreciated. We will distribute this further and we seek your feedback. A hard copy of the document has been made available at this Congress and will be reproduced in the Newsletter and at some stage placed on the ASL Web Page.

We are open to further suggestions for policy statements. Such documents need not follow the current examples.

3. **ASL Charter Following**

After our success in having the Futures document accepted and the release of the first policy statement we decided that an ASL Charter was needed. A further small group undertook to develop the Charter and seek comments on an initial draft. The final version has been released at this Congress and will also appear in the Newsletter and on the Web Page. The Charter did attract some comment and I encourage you to keep this current - change it if it does not represent the character of the Society.

4. **Fitzroy River Workshop**

As a direct consequence of the Futures document we were approached by a small group of WA members to part sponsor a workshop the Limnology of the Fitzroy River, Western Australia. We gave them $1000 in return for due acknowledgment of our support. The workshop was held on 18 February 1998 in Perth. The outcomes of the workshop were reported in the Newsletter - volume 36 no 1, March 1998. A copy of the report is available from Andrew Storey, Department of Zoology, University of Western Australia.

5. **Jolly Award**

Following a resolution from the Albury AGM we formed a small group to assess the protocols and conditions for the Jolly Award. After extensive consultation we have revised the protocols and these have been circulated for discussion at this AGM. We chose to delay any award for 1998 in order to give the AGM the opportunity to comment and adopt a final format - the Award is an important feature of the Society and we naturally wanted the AGM to either sanction our recommendations or to propose alternatives. We were also keen to seek views on whether an award could be made later in 1998.

6. **Newsletter, Listserver and Web Page**

Our ability to contact members and engage in limnological debate and furore have been hitherto primarily restricted to the ASL Newsletter. Fran Sheldon has again kept this going throughout 1997-98, and with great regrets has decided that it is time that some one else had this honour. We are seeking a new editor.

Our ability to communicate with each other has also been enhanced by the Web Page and the Listserver discussion group. These are valuable media and we encourage their use. The Listserver has a meagre 239 subscribers. This concerns me given the trend to internet communication. It should also concern the membership at large as we
have recently seen some discussion over the abandonment of the hard copy newsletter and its replacement with an electronic form. I certainly support this and a few others ardently seem to oppose it.

7. **1998 Congress**

This is being held at Ivory Rock in SE Queensland and we certainly appreciate the organising group that has been spinning around Gary Jones. Thank you for your efforts in getting us to the tent city and allowing us the opportunity to again engage in limnological intercourse..

During this Congress we introduced a few new ideas and we hope to see them continue. One that I certainly see as useful is the inclusion of a Presidential Talk in the congress program. This not only enhances the profile of the President within the Congress, but also provides an invaluable opportunity for engaging the Society membership in the future of the Society and the future of limnological science. With this theme in mind I presented a talk entitled Reasons for the Continuing Loss and Degradation of Australian Wetlands.

We also took the opportunity to host the inaugural AJ McComb Wetland lecture in recognition of Arthur's contribution to limnological science and education over many years. Margaret Brock delivered the lecture entitled Are Wetlands Ever Resilient, Redundant or Replaceable? Wetland Science, Management and Education into the 21st Century. It was as engaging as the title was long. Thank you Margaret. Thank you also to Arthur for your past and continuing contribution to science and many appreciative students - including myself.

8. **1999 Congress**

Another new and confirmed initiative is a joint conference with the New Zealand Limnological Society next year - in NZ. We plan to reciprocate in 4 years time and hope this will set a pattern of much greater communication and contact across the Tasman.

Max Finlayson
ASL President 1996-98
maxf@eriss.erin.gov.au

1998 AGM
37th Annual General Meeting of the ASL, 4July 1998, Ivory Rocks Conference Centre, Qld.

(p=proposed, s=seconded)

1. Adoption of the agenda, p= R.Marchant s=W.Williams, carried.

2. Apologies: I.McKelvie, L.Barmuta, D.Nias, P.Boon, D.Nielsen, R.O'Connor, J.A.Smith, J.Davis.

3. Acceptance of minutes of last AGM, p=P.Horwitz s=D.Hamilton, carried.

4. Matters arising: none.

5. President's report: M.Finlayson's report is attached.

6. Secretary's report: R.Marchant reported that the executive held two teleconferences since the last AGM (in October and April). Minutes of these meetings had been published in the newsletter. He had placed on the web site copies of the ASL constitution, the list of ASL experts, a draft of the ASL charter and the list of past office holders. He was investigating still the possibility of getting a short history of the society from some of the older members and placing this also on the web site. Finally he reminded members that he still had copies of ASL special publications nos. 10 and 11 (Aquatic Cryptogams, Catalogue of Australian Mayflies) for distribution.

7. Treasurer/membership officer's report: M.Hart reported that the ASL currently has 587 members (413 ordinary, 118 student, 19 institutional, 14 ten year members and 23 life). The financial report is attached. There followed some discussion about the investment of the ASL's funds. P.Horwitz proposed (s= B.Hart) that: "this meeting asks the future executive to investigate options for increasing income from existing funds". This was put to the meeting and carried unanimously.

8. R.Marchant proposed (s= A.Boulton) that a $1500 honorarium be paid to M.Hart (treasurer/membership officer); carried.

9. Auditor's report: this was read to the members and is attached. R.Marchant proposed (s= M.Brock) that it be accepted; carried.

10. Newsletter editor's report: Fran Sheldon informed members she would edit one more issue and then hand over to Ivor Growns who has volunteered his services . Max Finlayson summarised discussions that had taken place over the email about the suggestion to produce an electronic newsletter. It was generally agreed that the main effort in producing an issue of the newsletter was persuading people to write material for it, not in posting it out or assembling it; thus an electronic version would not

necessarily save much time or effort. As not every member has email M.Brock suggested a survey be carried out (via the next newsletter) to gauge members' reactions to the suggestion. P.Horwitz proposed (s= M.Finlayson) a vote of thanks to Fran Sheldon for all her efforts on behalf of the ASL newsletter; this was carried by acclamation.

11. Jolly award committee report: no report was given but P.Horwitz spoke about the process by which the sub-committee he chaired had arrived at a set of revised regulations for the award. He then explained various points in the new regulations (attached) which had been circulated to members and which he was now proposing the society should endorse. Discussion was opened. B.Williams broadly supported the new regulations as did K.Walker; but the latter was unhappy about the broader criteria (education and communication excellence, management excellence in addition to research excellence) proposed for recognising merit. He felt the award should be for scientific excellence only. B.Williams proposed (s= G.Jones) that: "the ASL adopt the executive's draft but modify the draft to indicate the area in which recognition is made". This motion was lost: 23 against, 10 for. B.Hart then proposed (s= A.King) that: "the ASL accept the executive's recommendations for the new ASL award as outlined in the document presented to the meeting". This motion was carried: 30 for, 1 against. A further motion was proposed by N.Rea (s= L.Rose) that: "the Hilary Jolly award be retained to be awarded for outstanding life time contribution to limnology". This motion was defeated: 3 for, at least 25 against. Finally G.Jones proposed (s= R.Marchant) a vote of thanks for the diligence of P.Horwitz and his sub-committee in producing the new regulations; this was passed unanimously.

12. Student travel awards: R.Marchant informed members that K.Muller, B.Ebner and S.Tjokrokusumo received travel support to attend the current congress and present papers.

13. Student awards (report given at the end of the conference not at the AGM): A.Boulton, as chair of the award committee, announced the following awards to students who had presented papers or posters: PhD award – R.Butcher; commendations to B.Ebner, T.Cox and R.Chiswell. Honours award – C.Hall; commendation to F.Betts. Poster award – T.Rankin; commendation to J.Marshall.

14. 38th congress: Ian Boothroyd briefly introduced the NZ Limnological Society, which although smaller than the ASL was very similar in composition and organisation. He invited the ASL to attend a joint congress with NZLS in December 1999. Location was still not finalised but it would take place in the north island of NZ and he hoped to have costs and dates by the end of 1998. As with the current congress registration would be possible via email. M.Brock proposed (s= R.Marchant) a vote of thanks for the invitation which was carried unanimously.

15. Future congresses: Darwin or Broome were both put forward as possible venues. P.Horwitz offered

to be the contact for a congress in WA.

16. Election of officers:
President - P.Horwitz (p= r. Marchant, s= K.Muller)
Secretary – R.Marchant (p= A.Boulton, s= G.Jones)
Vice-president – J.Chambers (p=M.Brock, s= K.Muller)
Treasurer: M.Hart – (p= B.Williams, s= J.Chambers)
ACT – R.Ogden (p= K.Jenkins, s=L.Oswald)
NSW – D.Nias (p= M.Finlayson, s=M.Brock)
Vic – R.Butcher (p=D.Nias, s=R.StClair)
NT – R.O'Connor (p= R.Marchant, s=J.Hawking)
Qld – G.Jones (p= R.Marchant, s=B.Williams)
WA – J.Davis (p=J.Chambers, s= A.McComb)
Tas – J.Jackson (p= P.Horwitz, s=J.Hawking)
SA – K.Muller (p= M.Finlayson, s=H.King)

All were elected unopposed.

17. Election of auditors: M.Hart proposed (s= K.Muller) that Coster Calgut be re-appointed as auditors; passed.

18. General business:
(a) ISSN numbers – M.Brock suggested that the ISSN number used in the past (13261142) be attached to abstract booklets. This number should be published in the newsletter for future congress organisers.
(b) Dryland rivers policy document – A.Boulton, K.Jenkins, S.Bunn, F.Sheldon, J.Puckridge K.Walker and K.Muller were thanked for producing this document and making it available to members at this congress. Policy documents were planned for urban streams and constructed wetlands. All policy documents should be on the ASL web page.
(c) Fitzroy River (WA) workshop – this workshop was partly sponsored by ASL and convened by A.Storey. A set of proceedings has been published.
(d) P.Horwitz proposed (s= R.Marchant) a vote of thanks to M.Finlayson for the energy and foresight with which he, as President, guided the society over the last two years. This was carried with acclamation.

Meeting finished at 7.45pm

FINANCIAL STATEMENT

AUSTRALIAN SOCIETY FOR LIMNOLOGY INC

PROFIT AND LOSS STATEMENT FOR YEAR ENDED 31 DECEMBER 1997

	1997 $	1996 $
INCOME		
Bank Interest	2,032	2,972
Congress	4,563	69,301
Intercol 1996 - Donation Refund	2,000	-
CSIRO Journals	-	140
Special Publications	77	350
Subscriptions - Members	14,385	14,775
- Students	1,820	1,330
- Institutions	800	985
- 10 Year	2,115	2,250
TOTAL INCOME	27,792	92,103
EXPENSES		
Audit Fees	590	590
Bank Charges	357	136
Telephone	945	1,156
Congress	5,343	57,123
- Students Travel Award	500	1,000
- Students Prize	400	300
CSIRO Journals	-	3,500
Depreciation	1,171	1,903
Gifts	59	282
Honorarium	1,500	1,500
Insurance - Computer	200	200
Intecol 1996 - Donation	-	3,000
Miscellaneous	32	32
Newsletter	7,444	4,449
Special Publications	-	2,944
Stationery/Printing/Office Supplies/Postage	862	1,520
Subscriptions - FASTS	2,205	2,205
TOTAL EXPENSES	21,608	81,840
NET SURPLUS FOR YEAR	6,184	10,263

AUSTRALIAN SOCIETY FOR LIMNOLOGY INC

BALANCE SHEET AS AT 31 DECEMBER 1997

	1997 $	1996 $
MEMBERS FUNDS		
Retained Surplus	73,255	67,071
Represented by:		
CURRENT ASSETS		
General Bank Account	21,789	8,316
A.N.Z. Trustees Common Fund V2 Plus	20,724	39,211
N.A.B. Deposit at call	31,692	3,690
Receivable - Bio Man Workshop	-	13,000
TOTAL CURRENT ASSETS	74,205	64,218
NON CURRENT ASSETS		
Office Equipment	5,653	5,285
less Provision for Depreciation	3,603	2,432
TOTAL NON CURRENT ASSETS	2,050	2,853
TOTAL ASSETS	76,255	67,071
NON CURRENT LIABILITIES		
Advance - Intecol Conference Donation for SIL 2001	3,000	-
NET ASSETS	73,255	67,071

AUSTRALIAN SOCIETY FOR LIMNOLOGY INC

DEPRECIATION SCHEDULE FOR YEAR ENDED 31 DECEMBER 1997

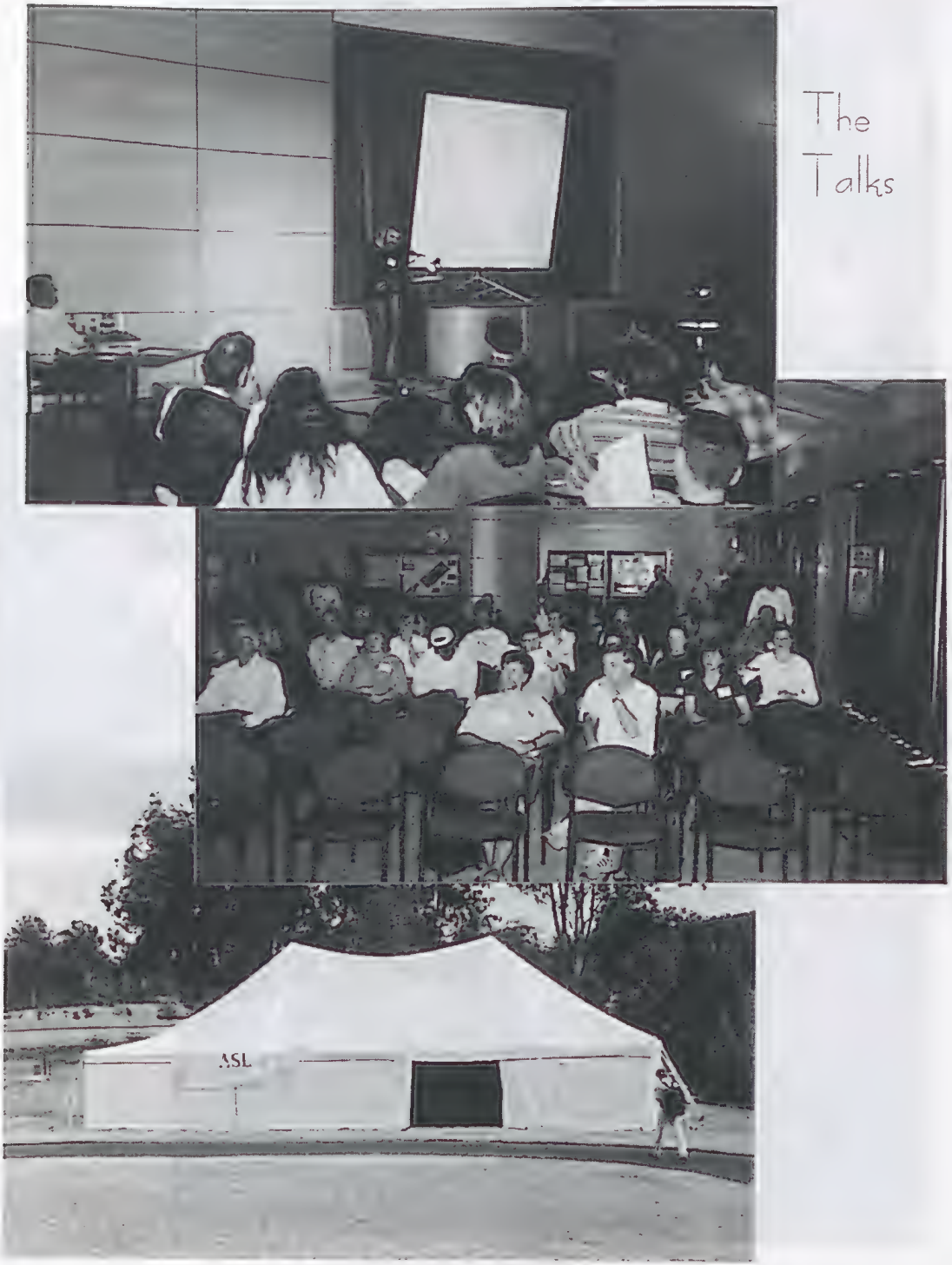
OFFICE EQUIPMENT

	Acquired	Cost	O.W.D.V.	Deprec	Rate	C.W.D.V.
Computer	2/10/95	3,290	1,777	711	40%	1,066
Printer	3/10/95	1,995	1,077	431	40%	646
Modem	14/03/97	368	368	29	40%	339
		5,653	3,222	1,171		2,051

The Venue

Social Life

The Talks



The Dinner

AUSTRALIAN SOCIETY FOR LIMNOLOGY MEDAL

CALL FOR NOMINATIONS

The Australian Society for Limnology Medal commemorates Hilary Jolly, a founding member of the Australian Society for Limnology, and is presented to a person who in the opinion of the Society, has made an outstanding contribution to Australian Limnology. The ASL Medal (formerly the Jolly Award) has become ASL's (and arguably Australia's) most prestigious prize in limnology, considered by members to indicate overall scientific excellence and outstanding achievement.

Any person may be nominated for the Medal , but nominations may only be made by financial members of the Society. The nomination must be in writing and must be seconded by a financial member of the Society. Nominations must address the relevant selection criteria and a current copy of the nominee's CV should be included if deemed appropriate. Each nomination will be assessed by a Committee of ASL which is chaired by the President. An award is not necessarily made each year.

The full regulations governing the Medal are outlined below.

Nominations should be forwarded to Dr Pierre Horwitz (President, ASL), Centre for Ecosystem Management, Edith Cowan University, 100 Joondalup Drive, Joondalup, WA 6027.

AUSTRALIAN SOCIETY FOR LIMNOLOGY MEDAL

Regulations

The following guidelines have been developed with a view to maintaining a consistent procedure for the Society for awarding the Australian Society for Limnology Medal.

Regulations concerning the structure and functioning of the ASL Medal Committee.

Selection Criteria

The ASL Medal will be awarded where an outstanding contribution to Australian limnology can be demonstrated by ANY OR ALL of the following:

- RESEARCH EXCELLENCE: the nominee has displayed excellence in any of the fields of limnological research, as demonstrated by key research papers and publications, or significant technological advances
- EDUCATION AND/OR COMMUNICATION EXCELLENCE: the nominee has played a significant role in the advancement and dissemination of limnological knowledge, where this has enhanced the knowledge of Australian aquatic systems in a variety of forums
- MANAGEMENT EXCELLENCE: the nominee has played a significant role in the protection of, conservation of, or management of Australia's limnological resources, and has shown administrative excellence in dealing with limnological issues.

NB. While the terms 'excellent' and 'significant' are relative and open to interpretation, the spirit of the award should be that the person has shown leadership and influenced others to achieve. Further, that influence should be sustained over a number of years.

The Medal is not intended for administrative excellence and service to ASL. These are more appropriately recognised by other awards, such as life membership of the Society.

Membership and meeting of the ASL Medal Committee

The Committee shall consist of three members: The President and two others selected by the Executive. In establishing the Committee, each new Executive should consider an appropriate balance in terms of gender, discipline and backgrounds of research/management, but must ultimately ensure that the Committee has experience in the judgement of limnological excellence. This may include previous recipients of the Medal (or Jolly Award). No one person should sit on the Committee for more than three years.

The Committee should discuss the award at a meeting or by telephone or by email.

The committee's chairman will be the President (or nominee) and he/she will be responsible for organising the call for nominations, circulating nominations and arranging suitable meetings for the selection process. The Secretary of the Australian Society for Limnology will provide administrative assistance as required.

The Committee will assess nominations and, where it deems that an award should be made, make recommendation(s) to the Executive, through the President, for final endorsement. A two-third's majority is sufficient for the Committee to recommend that an award be made.

A member of the Executive, or a member of the ASL Medal Committee, may not vote on a nomination where a conflict of interest is likely to occur. If the conflict of interest results in an inoperable Committee, the President (or nominee) is empowered to co-opt from the ASL membership for the purposes of a decision on the nomination.

Nominations

Any person may be nominated for the ASL Medal.

Only financial members of the ASL may nominate a person for the ASL Medal. The nomination must be in writing and must be seconded by a financial member of the Society.

Nominations must include a supporting statement addressing the relevant selection criteria and, if deemed appropriate, a current copy of the nominee's CV.

Assessed nominations will lapse immediately. Unassessed nominations (when the Committee has not been able to make a decision) will be forwarded to an incoming Committee.

Citation

The announcement of an award will be made at the annual conference and will appear in the Society's Newsletter accompanied by a citation describing the reasons for the award.

Award Value

The nature and value of the award will be determined by the Executive Committee of the Society. The award will normally constitute a Medal (suitably inscribed), and an economy airfare, registration and reasonable accommodation costs will be paid for the recipient to attend an Annual Congress (see below).

Conditions of the Award

Unless extenuating circumstances are operating, the Medal can only be awarded (and presented) to the recommended recipient in person at the next Annual Congress of the Australian Society for Limnology. In accepting the award the recommended recipient will be required as a condition of the award to present the "Hilary Jolly Memorial Lecture" to be scheduled during the Annual Congress. The Award address should be accompanied by a paper intended for publication in a refereed international journal, and the paper should include a footnote or byline to indicate its significance.

Prepared by a sub-committee of the Australian Society for Limnology, January - June 1998.

ANNOUNCEMENTS

FIELD LABORATORY

-ARNHEMLAND NORTHERN AUSTRALIA-

A quality field laboratory has been constructed at Djinkarr, on 'Messel's Lookout', near Maningrida in Central Arnhemland, Northern Territory Australia. The Laboratory and related facilities are owned by the Bawinanga Aboriginal Corporation (BAC) and operated by the BAC's land management agency, the Djelk Rangers. The landscape is vast and varied. Local environments range from coastal (including offshore - reef & seagrasses) through saltpans, dynamic estuaries, freshwater wetlands and billabongs, sandy creek channels, eucalyptus woodland, monsoon rainforest, rocky plateau to escarpment country. The region is rich in natural and cultural resources. The BAC is seeking interested persons to conduct research into any of the following fields:

- . Relevant land management issues
- . The sustainable harvest of natural resources
- Flora (aquatic & terrestrial)
- inventory, traditional use, commercial prospects
- . Fauna (aquatic & terrestrial)
- inventory, traditional use, commercial prospects
- . Alternative energy

Persons conducting research whose results will be valuable to the people of the region are offered the use of the field laboratory, accommodation and infrastructure free of charge. This also includes a unique cultural experience and an insight into the traditional knowledge of the region. The Djelk Rangers are available to assist with appropriate duties. Occasionally funds will be available to assist with the costs of getting students to and from Maningrida.

Please contact us with your ideas.

For more information contact

Ray Hall
Djelk Ranger Coordinator
rayhall@downunder.net.au
ph +61 8 8979 0490, fx +61 8 8979 0267
PMB 102, Winnellie NT 0822
Australia.

MARINE & FRESHWATER RESEARCH SPECIAL OFFER

Also see enclosed flyer

Marine & Freshwater Research

Special offer to Australian Society for Limnology members.
Personal subscription to Marine & Freshwater Research for $80
(standard personal subscription $120)

CSIRO PUBLISHING offers members of the ASL a special discount on a 1999 personal subscription to MFR. Simply complete the form below and return it to CSIRO PUBLISHING before 30 September 1998 and receive all 8 issues in 1999 for only $80.

For information about the journal, visit

http://www.publish.csiro.au/journals/mfr

I wish to subscribe to *Marine & Freshwater Research* in 1999.
I understand that if my subscription for 1999 is received before 30 September 1998, I shall be eligible for the special subscription price of $80.

MY CHEQUE FOR $80.00 PAYABLE TO CSIRO PUBLISHING IS ENCLOSED

OR CHARGE MY: ☐ MASTERCARD ☐ VISA ☐ DINERS ☐ AMERICAN EXPRESS ☐ BANKCARD

CARD NO. _____

SIGNATURE: _____ EXPIRY DATE: _____

NAME _____

ADDRESS _____

POSTCODE _____ PHONE NO. _____

POST this form today to	PHONE today to	FAX this form to
CSIRO PUBLISHING, PO Box 1139, Collingwood 3066, Australia	(+61 3) 9662 7666 or 1800 645 051 to pay by credit card	(+61 3) 9662 7555

POSTCARD FROM THE SEDGE

PRINTEMP EN CAMARGUE/SPRING IN THE CAMARGUE

Let's get one thing straight right from the start. I didn't organise to work at the Station Biologique de la Tour du Valat in the Camargue so I could spend spring in Provence. Nor did I do it for the four course lunch served daily in the Station's cantina. Nor for the (hangabout - does Lianne read this Newsletter. No.) French girls. Or for the flamingoes, or to learn some French, to live in a town with a 1800-y old Roman Arena, to stand where van Gogh painted 'Le caf+ de nuit', or to be in France for the World Cup.

But it helps. A lot.

And I get to impress people no end with amazing tales from my rugged Aussie colonial upbringing, including extraordinary feats such as seeing a kangaroo, having carpet snakes in the shed, walking in a rainforest and having a couple of convicts for ancestors. At which point they simultaneously raise eye brows, exclaim 'Ooh la la' and check for their wallets.

Being a widely read wetland ecologist, I learnt most of what I knew of the Camargue from a ten minute piece by Olivia Newton-John for 'Wildlife'. There she was galloping on a Camarguais white horse across a wind-swept swamp, replete with black bulls, flamingoes and otters. And all just 30 minutes south of Arles, one-time number one city in the western Roman Empire. With the monuments to prove it. And I thought to myself as I struggled with my thesis, "I'm there".

Tour du Valat is a largely privately-funded institution employing about 70 wetland researchers and conservationists. Its goal is to foster improved understanding and management of Mediterranean wetlands. It sits on a 2 500 ha reserve in the heart of the Camargue, and was one of the first voluntarily proclaimed reserves in Europe. The Camargue is arguably the largest and best Mediterranean wetland left in Europe (particulalrly after the recent major pollution event in the Donana wetlands, Spain), having been protected from development by its international reputation as a stop over for migrating waterbirds, big EU subsidies for the rice industry, and 10^256 mosquitoes. It forms the delta for the Rhône River, covering about 100 000 ha, of which one quarter receives very good protection in a national nature reserve. The rest is largely open slather to shooters, rice growers, canal builders and cattle. Only 40% of the Camargue is at least semi-natural.

Waterbirds congregate en route between Africa and northern Europe, which benefit from the increased availability of shallow freshwaters owing to flood irrigation etc, such as in rice bays. This pleases shooters immensely, but not so much the farmers who regularly find flocks of flamingoes trampling their crop. The altered hydrology has generally selected for more continental wetland plant species that were largely excluded from the Camargue when variability in water and salinity levels was greater (both seasonally and depth-wise). Intensive flood irrigation has increased shallow groundwater conductivity throughout, leading to widespread abandonment of rice cultivation. Such bays are now the target of restoration efforts, with stakeholders desiring three oft-conflicting goals: increased flora and fauna diversity and reinstatement of natural ecosystem functions are seen as a priorty by Tour du Valat scientists; shooters want to attract ducks, boar and the like; whilst the thatch industry desires fields of healthy and harvestable *Phragmites australis*.

Phragmites is a key species in such efforts as it is quite tolerant of flooding, increases sedimentation and nutrient entrapment thereby facilitating establishment in other species, and provides shelter, nest sites, and protection from the fierce mistral winds that roar down the Rhone valley. A major difficulty is that this species requires shallow water (<~3 cm) for germination and establishment, whilst ducks congregate where depths exceed ~30 cm. Conflicts frequently arise over the control of wetland sluice gates between stakeholders, leading to ad hoc alterations in water level. This results in sudden top-flooding of seedlings, leading to mortality. My work examines the establishment success of *Phragmites* seedlings under a range of flood timing and depth treatments over a growing season. Our hope is that patience and restraint shall prevail once people are better informed as to the specie's requirements and the benefits of fostering establishment and growth in the first year.

Stuart Blanch
Station Biologique de la Tour du Valat
Le Sambuc, 13200 Arles, France
stuart_blanch@hotmail.com

UPDATE: *Since sending this postcard Stuart and Lianne have returned to Australia and Stuart has taken up the position of Inland Rivers Network Officer for the ACF based in Sydney (at The Rocks!). Well done Stuart.*

ASL ISSUES

The following documents were released at the 1998 Congress. They are reprinted here for general information (without the pretty formatting!).

They are:

- The New ASL Charter
- The Dryland Rivers Policy Document
- The Future of ASL Document

A NEW CHARTER FOR ASL

The Australian Society for Limnology (ASL) is an Australian-based scientific society whose focus is the study and management of inland waters. The ASL was established in 1961, and has a current membership of over 500 researchers, managers, engineers, teachers and tertiary level students from all states and territories. Members have a strong professional interest in inland aquatic issues, including the maintenance of biodiversity, the maintenance and/or restoration of water quality, and the wise use of aquatic resources. The Society also has a strong interest in fostering the scientific and intellectual development of tertiary students.

The Society includes members working in government agencies, tertiary institutions and many industries related to aquatic resources. Through their daily activities, members have contact with local communities and are in a sound position to interpret and advise on inland water issues. The Society has a substantial knowledge base, and has assumed a responsibility to ensure that this is available to those who manage inland waters.

Accordingly, the charter of the ASL is to further our understanding of Australia's inland waters and to promote their wise use and sustainable management. In this manner we will contribute to the continued existence of this valued resource and the maintenance and enhancement of the quality of life for all Australians.

A Dryland Rivers Policy Document

Australia's arid zone is not completely dry, it contains wetlands of national and international significance including numerous large river systems - the dryland rivers of Australia. These rivers differ from those in temperate zones, particularly in the unpredictable variability of their climatic and hydrological regimes, and in the physical, chemical and biological characteristics that depend on these regimes. The flow regimes of Australia's arid rivers, with their erratic extremes of drought and flood, are probably the most variable in the world. They flow down gentle gradients through landscapes of low relief, so their floodwaters spread over vast and complex floodplains, encompassing networks of meandering channels and mosaics of floodplain lakes. This combination of flow variability and geomorphic complexity in an arid environment creates a distinctive "boom and bust" ecology, characterised by episodic intense reproduction and high productivity, by opportunistic, hardy plants and animals. Unlike most arid zone rivers elsewhere in the world, Australia's still have a few unregulated and unpolluted arid zone rivers. They are foci of arid zone biodiversity. Appropriate management of these rivers is critical to ensure a sustainable and wise use of their resources, and to conserve their extraordinary values.

The AUSTRALIAN SOCIETY FOR LIMNOLOGY (ASL) is an Australian-based scientific society whose focus is on research and further understanding of inland aquatic environments. The ASL was established in 1961, and has a current membership of over 600 scientists, managers, engineers, teachers and tertiary level students from all states and territories as well as some overseas members. Members have a strong professional interest in inland aquatic issues, in the maintenance of biodiversity and water quality, and the wise use of Australia's inland aquatic resources. The Society includes professionals working in most relevant government agencies, tertiary institutions and many industries related to aquatic resources. Through their daily activities, members have constant contact with local communities and are in a sound position to interpret and advise on their concerns over dryland river issues. The Society has both a substantial knowledge base, and a collective responsibility, to ensure that rivers are managed in a sustainable manner.

It is the belief of the ASL Dryland Rivers Working Group (DRWG) that the Society's knowledge base gives it a responsibility to contribute where possible to decision-making with respect to river management in Australia. DRWG Members have collectively over 100 years' research experience on dryland rivers. Using this experience the ASL offers its scientific expertise to governments and the public to assist in management issues. The Society can help! The Society wants to help!

This document has been prepared by the DRWG, and has the full support of the ASL executive. The ASL goal for dryland rivers is:

"To provide scientifically-based information to conserve and manage Australia's dryland rivers."

This document has been compiled for, and on behalf of, the ASL by the ASL DRWG. For further information concerning ASL, or ASL assistance with management issues, please contact the Society's Secretary, Dr Richard Marchant, Museum of Victoria, 71 Victoria Cres, Abbotsford, VIC 3170. Ph: +61 3 9284 0200. Fax: +61 3 9416 0475 (Email: rmarch@pioneer.mov.vic.gov.au

The Dryland Rivers Working Group (DRWG) includes: Jim Puckridge, Fran Sheldon & Keith Walker (CRCFE, University of Adelaide), Kerri Muller (Botany, University of Adelaide), Stuart Bunn (Griffith University), Andrew Boulton & Kim Jenkins (UNE).

What are the dryland river values we seek to conserve, manage and rehabilitate?

Intrinsic values

Australia's dryland rivers have features in common with dryland rivers elsewhere, but they exhibit these features to an extreme degree. They flow in the driest part of the world's driest inhabited continent, apart from those of the Murray-darling Basin, most others are almost entirely unregulated and are exceptionally variable in flow. Cooper Creek, for example, may not flow at all for months at a time, and then may experience flow rates as great as the Nile. Many Australian dryland rivers terminate in extensive inland wetlands, and exist on a large scale - the Lake Eyre Basin for example covers 1,140,000 km^2, one-seventh of the continent, and its largest rivers are 1,500 km long. Their floodplains feature a diversity of forms, including channel networks, waterholes, internal deltas, swamps and lakes giving these rivers ecological features such as extreme variability of habitat in space and time, pulsed productivity and distinctive adaptations of fauna and flora. The rivers also function in the arid zone as refugia for aquatic and terrestrial biodiversity. All these characteristics mark out Australian dryland rivers as distinctive and of great intrinsic value.

Beneficial values

Australia's dryland rivers play a major role in making our inland habitable, not only by supplying the practical requirements of water and shade, but by creating those diverse, complex environments flourishing with animals and plants, and are the focus of many human pastimes and activities. For these reasons, many of Australia's dryland rivers are key tourist destinations (eg. River Murray, Cooper Creek, Darling River, Finke River, Todd River, Gascoyne River). The episodic inundation of their floodplains (eg. Darling Downs, Cooper and Diamantina Channel Country, Gwydir River wetlands) also supports extensive and profitable grazing industries, worth $187m annually in the Lake Eyre Basin alone. Elsewhere (eg. Darling and Narran Rivers) the floodplain and lakes support opportunistic cropping industries which thrive after flooding. Some of these rivers (eg. Cooper Creek and the Diamantina/Georgina River) are among the few remaining unregulated large dryland river systems in the world and thus provide irreplaceable international scientific benchmarks for the study of the role of flow in dryland river ecology. Such studies are essential to inform the management, conservation and rehabilitation of dryland rivers nationally and worldwide. Some dryland rivers also form oases in the central Australian dunefield and gibber deserts which have been widely celebrated in art, literature and song, and form a vital part of our European and Aboriginal cultural heritage

The Australian Society of Limnology is well placed to help governments, industry and the public define dryland river values.

Do we know enough?

Because the focus of river scientists and managers has inevitably been on rivers close to population centres and subject to major development, our understanding of the often remote and relatively undeveloped dryland rivers is meagre. We do know enough to say that they function differently in important ways from rivers in more humid zones, but their extreme variability over time and the size of the major systems mean that many years of study will be required to develop a substantial understanding of their ecology. However, major proposals to develop these rivers have appeared recently, and it is a matter of urgency that funding for ecological studies be provided so that assessment and management of such proposals be adequately informed. Such studies should focus on:

- Distinctive ecological processes, particularly the role of flow variability
- The functions and roles of riparian zones, particularly in channel networks like the Channel Country of the upper Cooper Creek in south-west Queensland.
- The functions and roles of floodplains, including rarely inundated floodplain wetlands.
- The functions, roles and flow requirements of refugia for aquatic fauna, particularly the large permanent waterholes.
- Endangered, endemic and undescribed species.
- Impacts of terrestrial land uses, particularly riparian and floodplain grazing and vegetation clearance in headwaters
- Present and potential impacts of water diversions and impoundment's
- Groundwater issues

Why do we need to conserve Dryland Rivers?

Rivers worldwide have suffered enormous damage from the demands we have made of them, and in other parts of the world dryland rivers (e.g. the Colorado, Orange-Vaal, Syr-Darya, Amu-Darya) have probably suffered worst of all. Impoundment, water diversions, huge irrigation schemes, inter-basin transfers, grazing and cropping pressure on floodplains and riparian zones and mining pollution all have taken their toll. The outcomes of these interventions are obvious in diminished flows, pollution, salinisation, algal blooms, declines and extinctions of animals and plants. In Australia dryland rivers like Cooper Creek and the Diamantina River have so far escaped the most severe of these impacts, but others, particularly most rivers in the Murray-Darling, are in a critical state of ecological decline. Public awareness of this decline is growing. When Australia hosted the world's largest blue-green algal bloom in the Darling River in 1991, this stark example of a toxic dryland river sparked international concern for the state of one of our most important river systems.

The costs of rehabilitation, to the extent that it is still possible, are enormous. We must ensure that our resources are optimally directed, and this means using our best science to assess impacts, design remedial programs, assess results and adapt these programs interactively. We must also conserve the integrity of those dryland rivers which are still relatively undamaged, in part because we need them to model the goals of our rehabilitation programs, and to help us understand the ecological processes we are trying to manipulate. Where we consider it is justifiable to continue with resource development, we have to assess, monitor and adapt these developments far more wisely than we have done in the past.

Management of Dryland Rivers

Key Principles and Practices for Management

1. Recognising Variability

- The inherent variability of dryland rivers should be a central theme in long-term perspective's for research, monitoring and management. Models developed for low-variability systems should not be applied to these extremely variable ones. New modelling approaches are needed
- Episodic rivers and their wetlands have different biological functions from permanent ones, but are as biologically important. In fact, since episodic systems have been especially depleted by water resource development, they may be more important. For example, rarely inundated floodplain wetlands apparently play a crucial role in episodic waterbird breeding.
- To augment short-term hydrological and biological data,

⇒ long-term monitoring and research programs should be established, and

⇒ historical and anecdotal knowledge, including Aboriginal knowledge, should be utitilized.

- New modelling approaches, incorporating flow variability, should be developed for dryland rivers.
- Ecological studies should be undertaken as part of all assessments of development proposals on dryland rivers. These must span an appropriate period of time.

2. A Catchment Based Approach

- Some dryland river catchments cover large areas of inland Australia, and cross many private and political boundaries. Management must use a whole of catchment approach.
- Many dryland rivers have extensive floodplains, and their channel networks have multiple riparian zones. These are essential elements in the functioning of such rivers. The floodplain is part of the riverbed and must not be alienated from the main channel.
- Catchment management strategies should be established for all dryland rivers and involve national as well as local stakeholders, and have mechanisms for input of scientific advice.
- Riparian stock access should be minimised by off-river watering, and its impact monitored.
- Water harvesting, grazing, mining and other industry activities on floodplains should be managed for their impact on whole river functioning.

3. Adaptive Management

- The management of dryland rivers must adopt a precautionary approach, particularly as there are very few data for many of them. However, adaptive management approaches should only be employed where development impacts have been shown to be reversible.
- Adaptive management should require that adequate impact assessment programs be set up and binding agreements be made with developers to respond to the results of assessment. This may include interstate agreements for total catchment management.

4. Maintaining Dryland River Values

- Social and cultural values should be considered for conservation, management and restoration.
- Australia's dryland rivers are a national asset: they have value for all of the Australian community, and in some cases for the international community. This should be reflected in their management. Cooperation must be developed between scientists, regulatory authorities, industry, local communities and conservation organisations to establish common goals for conservation, management and restoration of dryland rivers. These rivers have important educational values yet are often distant from educational centres - this should be a focus for future environmental education.
- Representative examples of relatively ecologically intact dryland rivers should be selected by national survey (e.g. the Near-Pristine Rivers Survey) to act as benchmark systems. Such rivers should be quarantined from further development.

ΛSL

THE FUTURE OF ASL

History of this document

At the AGM held during the ASL Congress in Berri (September 1996) we accepted the following motion and proposed that we investigated the Future of ASL via the mechanism given below.

ASL forms a policy sub-group to investigate mechanisms (protocols) to

1 *Raise the profile of ASL with governmental policy makers and advisory panels etc*
2 *Deal with external requests for the provision of advice on issues*
3 *Provide interactive fora to debate conservation issues within ASL*
4 *Release ASL policy statements on selected issues*
5 *Maintain the current strengths of ASL*

And to present options to the Executive and the 1997 AGM.

The Executive asked members to contribute comments and ideas on the above. Five sub-groups were formed from Executive members and a list of voluntary contributors to address each of the individual points in the motion. The comments and ideas from these sub-groups formed the basis of a mailing on the ASL News Group and were further developed into the following document (hitherto referred to as the futures document).

In Albury (September 1997), the issues raised in this document were further discussed at the AGM and the following motions were passed:

1 *the ASL president be empowered to make public statements on behalf of the society, and all such statements be made only after appropriate consultation with the society membership*
2 *the ASL supports the ideas and actions in the futures document and this AGM asks the incoming executive to advance these issues and processes as outlined in this document*

Now that we have accepted these ideas and actions, we need to implement them. As a first step, a preliminary list of immediate tasks is presented at the end of the document. Please study this draft and accompanying list carefully and direct your comments to the ASL AGM in Brisbane 1998, electronic News Group or the quarterly Newsletter (refer to items specifically). If you have any concerns or ideas use this opportunity to have your say about the future of ASL.

The Document

1 RAISING THE PROFILE OF ASL WITH GOVERNMENTAL POLICY MAKERS AND ADVISORY PANELS ETC

ASL has not regularly provided expert advice to governmental policy decision makers nor nominated experts to governmental panels. If we want this to change we must raise our profile with government agencies. Past attempts to promote ASL as a forum for providing such input have not generally received a favourable response. It is proposed that a number of processes are adopted to promote ASL as a forum for expert scientific debate and advice within governmental agencies. Recent invitations to nominate independent experts to several bodies in Western Australia provides notable exceptions and demonstrates that ASL can fulfil this role.

1.1 The Executive establishes a "policy committee" that encourages and coordinates the release of appropriate statements on topical limnological issues through the various fora outlined below, with a particular emphasis of bringing this material to the notice of policy and managerial agencies at all levels of government.

1.2 Individual members within policy and managerial agencies are encouraged to promote ASL as a forum for debating limnological issues before, during and after the development of policies that affect aquatic research and management.

1.3 ASL seeks further means of cooperating with other scientific societies (such as Federation of Australian Scientific and Technology Societies, Institute of Biology) through, for example, joint conferences or special events that allow individuals to present credible scientific views on aquatic issues/policies.

1.4 Actively promote the list of ASL members who have volunteered to speak as experts on behalf of ASL, and consider a more appropriate name for the list.

2 DEALING WITH EXTERNAL REQUESTS FOR THE PROVISION OF ADVICE ON LIMNOLOGICAL ISSUES

It is accepted that ASL must maintain scientific credibility in the eyes of both its members and the broader community. Thus, we need to avoid sending a barrage of media releases on all issues that affect the conduct of research into and conservation of aquatic ecosystems. Steps that will assist ASL respond to such issues are given below.

2.1 The Executive be given total authority to develop a procedure to issue policies and/or statements that provide scientific comment on specific issues with ASL seen as the vehicle for debate rather than making pronouncements.

2.2 The list of ASL volunteers is revamped with a clear identification of the role of the list and means of promoting it within and without the Society.

2.3 ASL prepares a list of the Top Ten Limnological issues and actively promotes this and reviews it regularly.

2.4 The Executive actively seeks and supports a few governmental and non-governmental fora (such as the Biodiversity Council, Australian Wetlands Alliance) where it can focus its attention through nominated individuals.

2.5 The Executive creates a position for specifically collating responses for external comments and interaction.

2.6 The Executive is elected for a two year period in order to provide focal contacts for external interaction and to allow individuals time to familiarise themselves with the issues and procedures.

3 PROVIDING INTERACTIVE FORA TO DEBATE LIMNOLOGICAL ISSUES

A *Limnological Discussion Forum* in which issues can be informally debated should be developed and hosted by ASL on a regular and well publicised basis. The forum should allow for the discussion of limnological issues by both ASL members and others, but does not necessarily represent the views of the Society. This can be done through the written/electronic media already operated by the Society and by the hosting of a regular lecture/seminar.

Written/electronic media

3.1 There should be a written/electronic forum within ASL (eg Issues in Limnology section in the Newsletter and on the Home Page) where members or invited non-members can raise and debate issues.

3.2 These Issues Pages are not the stated position of the Society as a whole, but reflect the views of members or invited contributors (statement to this effect published with each Issue).

3.3 The Issues are not endorsed by the President or Executive (this would also be stated clearly with each Issue).

3.4 The member(s) raising the Issue must act as the spokesperson and include their name, address and contact numbers (and email) before the Issue will be 'published'.

Lecture/Seminar

3.5 There should be a regular verbal lecture/seminar forum within ASL where members and invited non-members can raise and debate issues.

3.6 The lecture/seminar is not the stated position of the Society as a whole, but reflects the views of the speakers (statement to this effect made at the commencement of each presentation and with any advertising material).

3.7 The Issues are not endorsed by the President or Executive (this would also be stated clearly at the commencement of each presentation and with any advertising material).

3.8 The member(s) speaking on the Issue must include their name, address and contact numbers (including email) before the Issue can be presented

3.9 The Executive may decide to formally publish the material presented (this would be made clear prior to the presentation).

4 RELEASING POLICY STATEMENTS ON SELECTED ISSUES

There are two modes by which ASL could release information to the public: i) *Policy Documents* and ii) *Issue Statements*. The procedures for releasing information once it is formulated also need to be addressed at an early stage during the process of formulating a Policy or Statement.

Policy documents and issue statements

Policy Documents

4.1 ASL should produce Policy Documents (eg Wetlands Policy Document) on specific aquatic issues. These would outline the general position of ASL, as represented by a specifically formed sub-group, but would tend to be fairly broad in nature and non-binding on members. ASL would act as the vehicle for distributing informed comment on specific issues under the guidance of the Executive and the AGM.

4.2 Policy documents could be produced for:

1. Wetlands (already done)
2. Arid Rivers (in prep.)
3. Urban Streams
4. Flow Regulation, etc.

4.3 The Society President and Executive would endorse these documents and ASL would fund the printing of a number of copies to be distributed to a selected audience.

4.4 Policy Documents would be placed on the Home Page and also published in the Newsletter and News Group.

4.5 The Society President and Executive would nominate someone to be the spokesperson for each document (probably the person who was integral in putting the document together).

Issue Statements

At various times ASL will be requested to make statements or it may wish to state the ASL position about specific issues (eg cotton irrigation proposals, environmental flows). This requires a mechanism for the prompt release of ASL endorsed statements suitable for release to the media.

4.6 The material may be put together by any ASL member (with proven relevant expertise) and submitted to the Executive for endorsement.

4.7 Endorsed statements would require the signature of at least five (5) members of the ASL Executive which currently comprises 14 members (5 executive officers, 8 regional members and the editor) and acknowledgment by the President.

4.8 The person who was primarily responsible for collating or preparing the material for the statement would act as the principal media contact - the Executive should also act as regional contacts.

4.9 Release of a statement would be through national and regional media - it is the responsibility of each ASL Executive member to ensure the material is disseminated in their State/Territory under guidelines for media dissemination.

The release of policy and statements

If the release of ASL policy or statements are to "have an impact", ASL will need to become more aware of the media and its requirements for successful publication. A set of procedures (guidelines) should be developed to facilitate the dissemination of ASL information. These should address the following:

4.10 Immediacy of action to ensure a comment on a particular issue gets to the media whilst it is still a hot topic through, for example faxstream addresses of media outlets (on a state/territory basis) being held by the Executive.

4.11 Readily access to media contacts for regional comment with the Executive as the initial, but not only, referral point for each State/Territory.

4.12 Insertion of a standard piece about the ASL (eg its membership, charter, etc)

4.13 Storage of material for immediate release, such as short pieces on recurrent themes of sustainable development of aquatic resources, and the inadequate funding for limnological research.

4.14 Availability of visual material for television, such as standard shots of wetlands, rivers, lakes, land degradation, etc.

4.15 Targeting different forms of media and to time the releases for maximum exposure

5 MAINTAINING THE CURRENT STRENGTHS OF ASL

Open recognition of the values and strengths of ASL is needed and should be constantly reassessed to ensure that relevance and service to members is maintained and/or updated. Some of the current strengths are presented below. It is noted that these strengths can only be maintained by active involvement of sufficient numbers of members.

5.1 ASL has a casual and relaxed manner that is open to all and friendly to newcomers, not daunting to students and is not enmeshed in formal procedures.

5.2 The Society has a strong student base and actively encourages student attendance at and participation in its informal annual congress.

5.3 ASL is essentially a scientific society that encourages debate and presentation of research materials and has no delusions of being a professional society or a political lobby group.

6 WHAT NEEDS TO BE DONE?

6.1 define 'appropriate consultation' in the first motion passed in Albury and develop guidelines by which the Executive can appropriately consult the membership before releasing statements.

6.2 decide upon a name for our list of volunteered experts, the role required of them and ways in which the list can be promoted

6.3 establishment of a 'policy committee' see 1.1

6.4 prepare a list of the Top Ten Limnological Issues which will be actively promoted (outside of the society) and reviewed (perhaps at annual AGMs)

6.5 raise issues for debate on the NewsGroup and in the Newsletter and consider other issues that may require ASL to release a specific policy statement

6.6 produce policy documents on issues already highlighted e.g. Urban Streams and Flow Regulation (any volunteers??)

6.7 help your Executive member to compile a list of national and regional media contacts e.g. faxstream numbers

6.8 develop a strategy for releasing media statements effectively

6.9 add to the list of the strengths of ASL

ARTICLES

AUSTRALIAN SCIENCE - DRIFTING OR SINKING?

Australians have something of a love-hate relationship with science. We seek a strong economy with lots of fulfilling jobs, good health services and an attractive environment.

Australians see science as the way these goals can be reached. And yet science is in trouble. Students are finding it less attractive, career options seem more limited. Are we drifting or sinking? Marie Celeste or Titanic?

There is more support for the Marie Celeste analogy - sailing without leadership or direction to who-knows-where.

Australian Government sees competition as a panacea for many of our ills, and are busily privatising Government business enterprises, developing purchaser-provider models to improve competition and making a ruthless push for short-term economic efficiency.

Governments do not have sufficient funds to do all the things their citizens would like or need. No Government seems prepared to raise taxes to fund the widening call for Government support, and must make strategic choices as to their investment priorities.

Australia faces some stark choices in a competitive global environment. An Australian Business Foundation report "The High Road or the Low Road: Alternatives for Australia's Future" (Marceau, 1997) spells out our options.

Do we seek to compete as a low wage economy based on our resources? We can do this by reducing wages, living standards and environmental controls. We will continue with industries that are price takers in the global economy. This future will involve low paid jobs, many in the service industries, many part-time. This trend is already obvious in much of our recent job growth.

If we choose this road we will import our technologies when others are ready to sell or licence them to us. We will continue a heavy dependence on natural resources where we take the prices the world wants to give us rather than be able to demand a premium for smart products.

On the other hand we might choose to be part of the emerging "knowledge economy", with an emphasis on the use of information as the basis for innovation, competitiveness and growth.

The low road seems favoured by our present mix of policies.

To take the high road would require a shift of resources into more knowledge-intensive industries, through better innovation programs and restoring our once excellent science base.

While Australian Government expenditure on R&D is already quite high in international terms, business expenditure lags seriously. Marceau argues that the cause is the mix of Australian industry.

If this is true then berating existing industry, developing innovation packages or bribing industry with generous tax concessions will not be effective.

If we are to encourage science-based companies whose services command a premium in world markets, then we need a financial and taxation environment which enables them to grow their businesses in Australian.

The departure of Memtec for the USA suggests the settings are not right, and the promised and long overdue reform of our taxation system needs to address issues such as capital gains tax in high risk areas.

Focussing investment (including tax breaks) into areas of high potential seems more sensible than spraying money across all areas, despite the wish of industry that they all share in the largesse. Their ongoing mantra is "Governments can't pick winners".

Our industry is not too good at picking winners either. Biotechnology, environmental industries, information technology and materials science all look promising areas for investment, and there are others.

We need a strong science base and smart programs to link industry with science. Government clawed back considerable funds from the university sector and also by winding down the tax incentive to industrial R&D, the latter on the grounds that it wanted to target investments more strategically.

We are still waiting. There were no new ideas in the last Budget to stimulate innovation and technology, although the Government's commitment to the CRC scheme is welcome as a bridge between research and industry.

Our universities are undergoing tumultuous change, and science is bearing much of the brunt of the new imperatives. Expenditure per student at even our most prestigious universities is about 70 per cent of expenditure at comparable institutions overseas.

This sort of information does not support the Government's view that the university sector is inefficient and needs to be further squeezed.

But universities need to look at themselves as well. The oversupply of postgraduates may not be unconnected to a view common to academics that they have a right to postgraduate students.

Universities seem paralysed by the discipline structure and artificial divides between basic and applied sciences, even in the face of draconian pressure being applied by Governments.

Vice-Chancellors are encouraged to create new science departments, but let them try and close old ones and listen to the protests. Many of the disciplinary boundaries between basic and applied science are now quite blurred, and we must question their value.

If science is again to prosper, it will because of industry demand. Industry will strive to employ science graduates, exploit the findings of science, and work in collaboration with scientists to gain a competitive advantage.

Governments will only achieve their objectives for industry, environment and public health by working from a strong science base. They need to replace the present agency-based piecemeal approach to science with a "whole of government" approach which thinks of the big picture.

The Marceau Report suggests that Australia, almost alone amongst developed countries, is failing to shift resources into more knowledge-intensive industries. The responsibility lies with Government, for the investment and taxation settings they provide for industry.

Strategies the Report puts forward include sustained investment in education and research, and a well-defined innovation process. A number of our competitor countries have chosen these strategies.

I would suggest three tasks to our Government if it seriously want to pursue the brave new world of the knowledge economy:

- develop new innovation strategies to help start-up companies in broad areas of science, with complementary taxation measures to encourage investment in high risk investments.
- maintain university science by supporting infrastructure, science programs and basic research through the ARC and the NHMRC.
- ensure Government agencies develop coherent knowledge strategies so they use the best available science to deliver services in environment, health, primary industry, communications and other areas.

The choice remains before us. We could be crew members of Australia II rather than the Titanic or the Marie Celeste.

Peter Cullen

FASTS President

GST AND SCIENTIFIC RESEARCH

The scientific community welcomes the Government's commitment to reviewing the tax system.

It seems that the way we treat capital gains is a positive disincentive to high technology start up firms growing in Australia. The fact that one such company, Memtech, was recently sold to American interests make it clear that we do not have a level playing field, and that the Government's present capital gains taxes are an impediment to growing such firms in Australia.

The Federation of Australian Scientific & Technological Societies is of the view that a high technology, knowledge based society is the only attractive future for Australia. We seek policy settings that will help bring it about rather than provide barriers.

We are concerned about the recent sharp drop in Business Expenditure in R&D, the first such drop since the ABS commenced collecting the statistics in the mid seventies. It seems clear that industry in Australia does not have the confidence or conviction to invest in R&D under the present financial settings and economic climate.

The removal of tax incentives seems to have reduced "research" in the finance sector more than in industry R&D. We are concerned however about the slow start to the START scheme which was supposed to provide more targeted industry support to R&D and was underspent by $50 million last year.

The science and technology community does not oppose a GST in principle, but it does have concerns about how such a tax might be developed and what impact in might have on universities, CSIRO and other research organisations.

At present these organisations are largely exempt from sales tax. If a broadly based GST was introduced they might be taxed not only on their scientific equipment and supplies, but on any services they purchase.

This could introduce a serious impost on research. Industry investment is already catastrophically low in R&D investment, and a GST tax impost hardly seems a sensible way to improve the situation. If a GST increases the cost of doing research what does the Government intend to do to prevent a further decline in Business investment in R&D in science and technology?

The GST is likely to have major impacts on universities if the New Zealand experience is anything to go by. Students paying transport and accommodation costs for excursions and field work find they have a GST imposed, books and scientific serials are taxed, departments that buy in services (the current outsourcing fashion) find they are taxed on the services.

The universities are also finding a major clerical load in being expected to keep track of the tax on myriads of small purchases and transactions? Will university operating grants be increased to pay for the tax and the

administrative burden, or is this just another way that operating costs can be removed from the education process itself?

FASTS could not support any measures that increased costs to the university sector or other research groups by adding to their direct costs or administrative load. The universities have enough on their plate as it is. Education needs to be "zero rated" as at present, or compensatory funding needs to be provided as part of the University operating grants.

FASTS believes that research and development should be encouraged as an activity vital to Australia's future. There is a strong argument for scientific research activity (as well as the provision of educational services) to be zero rated in any GST. This is a simple and explicit means of encouraging R&D. We appreciate that many groups are seeking exemption from a GST, and the problems this gives to Government. If the tax is indeed to be broadly based, then other compensation mechanisms for research providers and those that commission the research should be developed.

We look forward to a better tax system that will encourage industry and research groups to create wealth, employment and solutions to our environmental problems.

Peter Cullen

President, FASTS

NEWS FROM FASTS

FASTS, THE ELECTION AND S&T POLICY

Below are ten key questions framed by the FASTS Board. FASTS will be putting these to politicians over the next few weeks. The impact is across a wide range of Portfolios - not only Science and Technology.

The answers will help scientists and technologists determine the way they vote.

THE TEN QUESTIONS

Question 1:
Australia will suffer a serious shortage of qualified science and mathematics teachers in secondary schools and colleges by the year 2000.

How will you and your Party overcome this shortage?

Question 2:
Bill Clinton, President of the world's most successful economy, said earlier this year: "We must seize this moment to strengthen our nation for the new century by expanding our commitment to discovery, increasing our support for science." Then he announced the largest funding increase in American history for science and medical research.

What policies have you and your Party to encourage Australian scientists to develop their best ideas, and what funding will you apply to enable them to do so?

Question 3:
Australian science and technology supports industries in the bush such as wine, mining and agriculture. They build better communication and transport systems, and help protect our environment. CSIRO, the universities and other research institutions contribute to community life in rural areas.

How will you and your party support research and technology to strengthen Australian industries in the bush?

Question 4:
When Australia looks to the next century, biotechnology and information technology are among the areas which offer huge potential growth and employment.

What vision do you and your Party have for Australia in the 21st century?

Question 5:
The capacity of Australian universities to provide world-class education and research training is being threatened by:

- budget cuts to operating costs
- the decline of laboratory and library facilities
- outdated equipment
- increased teaching loads
- the failure of Government to meet properly negotiated salary increases

How do you and your Party plan to put our universities back on an internationally competitive footing?

Question 6:
In 2004 Australian territory will more than double in size under the United Nations Law of the Sea. Twelve million square km of under-sea territory will be added to the nation's land area of nearly 8 million square km.

How will you and your Party ensure that Australia has the scientific and technological expertise to manage this potentially rich resource responsibly?

Question 7:
The Australian Research Council funds a large part Australia's basic research. But the last Budget wrote in future cuts of $33 million (7.5%) in 1999-2000 and a further $28 million in 2000-2001. This will make it even harder for scientists to gain funding for their research.

Do you and your Party believe that funds for research should be increased? If so, how and when will you increase them?

Question 8:
Job insecurity, lack of career paths and low salaries are driving good young scientists away from jobs in research. Australia is in danger of losing a generation of scientists and technologists.

How will you and your Party work with industry, providers of venture capital and research organisations to encourage research and the commercialisation of research?

Question 9:
This year, business expenditure on R&D dropped for the first time in 20 years. Australia's ranking is way behind comparable countries - 19th out of 24 OECD and Asian nations.

What will you and your Party do to encourage industry to invest in the new ideas and new technologies to generate wealth and jobs in Australia?

Question 10:
The Boston Report said Commonwealth funding should increase by $125 million per annum to restore university infrastructure to satisfactory levels, but many university laboratories no longer even meet basic health and safety requirements.

Do you and your Party support increased spending to restore the laboratories and libraries of our research organisations?

FASTS JUNE CIRCULAR

1. THE BERD HAS FLOWN

Australia has just recorded its first fall in business expenditure on R&D (BERD) since the Australian Bureau of Statistics began measuring R&D in the mid 1970s.

This is another gloomy sign for Australia's economic outlook, and a bad sign as we enter a millennium which is going to place an increasing emphasis on industries that are sophisticated, intelligent and sustainable. It increases pressure on the Federal Government to bring forward reform of the tax system, to remove disincentives to business to invest in the industries of the future. It is clear that industry in Australia does not have the confidence or conviction to invest in R&D under the present financial settings and economic climate.

The Asian currency meltdown is outside the Government's control, but we can do something about a tax system which seems almost perverse in its inability to encourage innovation. Addressing the capital gains tax issue would be a start.

Industry will respond to the right settings. The CRC Program is a well-tuned government incentive. Its success is demonstrated by the fact that 147 groups have already indicated they will compete for the 30 places available in the next round of selections, with a closing date for applications of September 30.

A fall in BERD was widely predicted since the abolition of the 150 per cent tax deductibility for industrial R&D in the 1996 Budget, and its replacement by the START Scheme.

START is the latest in a long line of incentive schemes, and I hope it will take effect now that it is fully in place. START has been slow to bite so far, with $50 million being returned to

Government coffers because it was not taken up last financial year.
The decrease in BERD does need to be read with caution, because the fall in 1996-97 was exaggerated by an unusually high figure for 1995-96. But the figures confirm an unacceptably low performance in the international arena. Last year Australia outranked only China, Italy, India, New Zealand and Spain in an comparison of BERD in 24 countries from the OECD and Asian-Pacific region.

2. PM'S SCIENCE, ENGINEERING AND INNOVATION COUNCIL

The newly expanded PMSEIC is one of the successes of this Government. As one participant said, it has moved beyond the "Little Golden Book of Science" for Ministers to a body where significant national issues are raised and acted upon.
The Committee structure recommended by John Stocker, the inclusion of more of the major players in the S&T world, and the personal commitment of the Prime Minister have all been important ingredients in this.
Some excellent papers were presented at the last meeting, notably by ARC Chair Vicki Sara on the interactions between industry and universities; and Academy of Technological Sciences and Engineering President Tim Besley on the nexus between science and its applications.
I am chairing the first sub-committee established by PMSEIC, to investigate solutions to the salinity issue in Australia.All PMSEIC papers are now available on the web at: http://www.dist.gov.au/science/pmseic/pmseic.html

3. GST TAX AND RESEARCH

I am in the final stages of preparing a letter to the Treasurer on the implications for scientific research of a GST tax. There are a number of questions to be answered before scientists and technologists can express any opinion on the GST.
These include:

1. Will a GST act as a disincentive for interaction between the university and business sectors, by being applied to consultancy agreements without any compensating advantages?
2. Will universities and other research agencies be exempt from GST as they are from sales tax? Will they be 'zero rated' in most areas, and what will any exceptions be?

FASTS is approaching this issue with some caution, despite assurances from our colleagues in New Zealand that the tax has been widely accepted in that country.

3. REVIEW OF AUSTRALIAN RESEARCH COUNCIL

I met with David Penington to discuss future directions for the ARC, as part of a review of its organisational structure initiated by the ARC.
A draft paper has been circulated. When this report is finalised in mid-July it will be incorporated in the Council's Strategic Plan and general comment will be invited.

5. NEW ISSUES FOR THE FASTS' BOARD

The Board has invited Merilyn Sleigh (Dean of Life Sciences UNSW) to address its next meeting on one of the "issues of the future". Her talk will discuss how Australia might cater for new and developing disciplines and subject areas that perhaps are not well

served by the traditional disciplines. One problem facing a new career scientist is that the most promising areas are multidisciplinary.
This discussion will be developed at Council in November, with the possibility of developing this discussion at a general forum early in 1999.

6. SCIENCE NOW!

Melbourne organisers of Science NOW! in Science Week report over 260 media "hits" to give good coverage of this new-look science forum.

The Fresh Scientists - those younger scientists who had presented stimulating papers at conferences - gained excellent coverage, and organisers are looking to boost this section in 1999.
I am one of the members of the Forum's board, along with the Presidents of the two science academies, the Science Communicators, the National Press Club and ANZAAS.

7. MEETING WITH DIST

Together with Joe Baker and Toss Gascoigne, I met with four officers from DIST led by Paul Wellings last month. The informal meeting raised matters of concern to both sides, and it was agreed to keep details confidential to enable frank discussion.
The meeting discussed venture capital and commercialisation, and may lead to a joint study on the impediments to commercialisation for working scientists. FASTS raised the issues of possible impacts of a GST on research organisations, and a funding mechanism for major national research facilities.

8. GRAHAM JOHNSTON AM

Congratulations to former FASTS' President Professor Graham Johnston, who was awarded an AM in the latest honours list for 'Service to bio organic chemistry and pharmacology, to scientific organisations and science policy development'.
Graham presented the first FASTS' policy document "A Science Policy for Australia in the 21st Century" to the Australian Government in June 1995, signalling FASTS taking a new proactive role in science policy development. He continues to run the FASTS' web site.
Other scientists to be honoured in the Queens' Birthday list included Professor Antony Burgess (AC) Ludwig Institute in Melbourne for scientific research and clinical medicine; Emeritus Professor Mollie Holman (AO)Monash University for scientific research related to autonomic nervous system function and control of smooth muscle, and to education; and Professor Lesley Parker (AM), Deputy Vice-Chancellor of Curtin University, for promoting gender development in mathematics and science education

9. STATE S&T AGENCIES

FASTS is to one of the co-sponsors for the next meeting of the State and Territory agencies concerned with promoting S&T in their jurisdictions. The meeting will be hosted by the ACT Government, and DIST are the other co-sponsors.
I think that we can play a particularly useful role in working with State and Territory agencies, in contributing to their S&T plans and providing expertise where appropriate. Toss Gascoigne is joining a small

organisational committee to establish the meeting.

10. DRAFT MARINE S&T POLICY

Minister John Moore recently launched a draft version of the Marine S&T Plan, for comment (preferably by July 15). It is available from DIST (GPO Box 9289, ACT, 2601) or on the web: www.dist.gov.au/science/marine/draft

NEW BOOKS

GUIDELINES FOR THE MANAGEMENT OF LARGE WOODY DEBRIS (SNAGS) IN RIVERS

Chris Gippel, Brian Finlayson & Ian O'Neill
Centre for Environmental Applied Hydrology, University of Melbourne

When it comes to snags - the branches, large limbs and whole trees that fall into rivers - the best management strategy, according to a booklet recently produced by the Land and Water Resources Research and Development Corporation (LWRRDC), is to sometimes let these sleeping logs lie. The booklet gives landholders, river management authorities, landcare groups and other managers clear guidelines for living with, and managing, snags in rivers.

By recognising the positive contribution of snags to river ecology and encouraging minimal modifications to snags, the booklet represents a significant shift from traditional snag management strategies. Millions of dollars have been spent removing snags from Australian rivers.

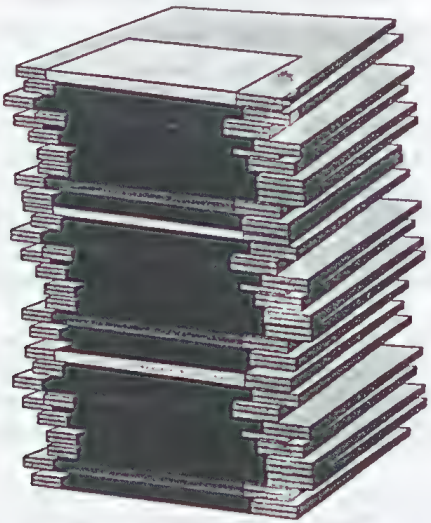
Snag removal was often undertaken because of fears that snags aggravated flooding and erosion. However, these fears may be largely unjustified. Using hydraulic laboratory tests and field measurements in the Murray and Tumut Rivers in New South Wales, as well as the Thompson River in Victoria, the team found that the affect of snags on river flooding was usually small and certainly far less than has been traditionally believed.

Recognition that snags play a vital role in river health management has led to moves to put snags back into rivers in some areas. Snags are responsible for creating a diverse range of flow conditions which are an essential aspect of the habitat requirements for fish and other river animals. Snags are vital for the survival of important fish species and macroinvertebrates by providing spawning habitat and shelter from predators. Leaves and rotting wood are also a major source of food for aquatic invertebrates - which in turn become food sources for fish and river animals.

For a copy of the free booklet phone the Snag Hotline on (02) 6299 6036

CONFERENCE REPORTS

WANTED



reports from:

- ASL 98 - Brisbane
- SIL 98 - Dublin
- NABS 98 - Canada
- Diatom Symposium - Perth
- ASLO/ESA - Missouri

CONFERENCE CAPERS

Send information about forthcoming conferences, workshops or meetings to the editor.

AUSTRALIA 1998

- **Willow Management in the Murray-Darling Basin.** Murray-Darling Basin Association, 20-21 August. Details Leon Broster 08-8226 595

- **Managing Dams in a Competitive Business Environment.** Australian National Committee on Large Dams and the New Zealand Society on Large Dams 1998 Annual Conference, 29 August - 4 September 1998, Sydney. Details from Ian Forster (02) 9268 7633 or ancold98@damsafety.nsw.gov.au

- **15th International Diatom Symposium**, 28 September - 2 October 1998, Curtain University, Perth WA. Pre-registration by 30th October 1997. Information from Jacob John, School of Environmental Biology, Cutain University of Technology. GPO Box U 1987, Perth WA 6845. Ph: (08) 9266 7327; Fax: (08) 9266 2495; Email: RJACOBJO@cc.curtain.edu.au. or visit the home page on http://www.curtain.edu.au/curtain/dept/enviro/15IDS.html

- **Wise Use of Wetlands by Indigenous People in Northern Australia** (Workshop), The Centre for Tropical Wetlands Management at the Northern Territory University, Darwin, Australia, 29-30 September 1998, Batchelor, approx 100 km south of Darwin. Registration will cost about A$150 with accommodation and meals extra. For further information contact Maryanne McKaige or Jenny Carter at the Centre for Tropical Wetland Management, Darwin. fax +61-(0)8-89466847 tel +61-(0)8-89466726 email ctwm@ntu.edu.au

- **Ecology Society of Australia** - joint meeting with New Zealand Ecology Society -see in Overseas section

- **1998 Australian Society for Biochemistry & Molecular Biology and the Australian Society of Plant Physiologists Combined Conference,** 28 September - 1 October 1998, Adelaide Convention Centre, South Australia.. Co-convenors : Dr John Wallace and Prof Joe Wiskich. Sally Jay, ASBMB National Office. Email: asbmb@camtech.net.au Phone : 61 8 8362 0009 Fax : 61 8 8362 0038

OVERSEAS 1998

- **VII International Congress of Ecology**, 19-25 July, Florence Italy. Contact details: Phone: +39-187-400252, Fax: +39-187-420727, Email: afarina@tamnet.it or visit the web site: http://www.tamnet.it/intecol.98

- **27th International Association of Theoretical and Applied Limnology (SIL)**, 9-15 August 1998, Dublin, Ireland. Theme for the congress is "water of life". Further information from: Declan Murray, Secretary General, XXVII SIL Congress, UCD Environmental Institute, Richview, Clonskeagh, DUBLIN 14, IRELAND. Information can also be found at the web site: http://nis.rtc-tallaght.ie/conferences/sil98/sil98.htm

- **International Conferences on Ephemeroptera and Plecoptera**, 17-23 August 1998, Tafi del Valle, Argentina. Email: mayfly@unt.edu.ar

- **Water Quality and Waste Treatment: Environmental solutions must be economically sound** - Australia Indonesia Environmental Science Project and Mataram University (Lombok-Indonesia), 3 day conference in Lombok, 19-22 October 1998. For more information visit: http://www.wsc.monash.edu.au/til/conference

- **Ecology Society of Australia** and **New Zealand Ecology Society** joint meeting, 23-27 November 1998, Dunedin New Zealand. Further information from Diane Daly - diane.daly@stonebow.otago.ac.nz, Fax: 03 477 8631 or http://www.otago.ac.nz/zoology/ecology/eco98.html

- **18th International Symposium of the North American Lake Management Society (NALMS)** - "Cooperative Lake and Watershed Management: Linking communities, Industry and Government", 11-13 November 1998, Banff, Canada, Further information via Email: kotak@compusmart.ab.ca or visit the web page at http://www.biology.ualberta.ca/alms/1998.htm

- **International Water Supply Symposium** - "Water Supply Systems in the Urban Environment: Perspectives on the Future", 19-20 November 1998, Tokyo, Japan. Further information from the web page on http://www.tokyo-teleport.co.jp/tokyo-suido/

AUSTRALIA 1999

- **Second Australian Stream Management Conference**, 2-11 February 1999, Adelaide, South Australia. Further details from Jim Burston Ph: 08-8200 3810 Fax: 08-8339 7112 email: jburston@denr.sa.gov.au

OVERSEAS 1999

- **New Zealand Limnological Society (NZLS) and Australian Society for Limnology (ASL)** joint meeting, december 1999, North Island of New Zealand.

FURTHER IN THE FUTURE....

- **28th International Association of Theoretical and Applied Limnology (SIL)**, February 2001, Melbourne, Australia.

- **29th International Association of Theoretical and Applied Limnology (SIL)**, August 2004, Helsinki, Finland.

ASL VOLUNTEERS

The following people have volunteered to speak as experts on behalf of the ASL. If you wish to be included on the list contact:

Dr Richard Marchant (ASL Secretary)
Email: rmarch@pioneer.mov.vic.gov.au

The following members are prepared to speak on behalf of the ASL on their area of expertise.

Name	Area of Expertise	Contact Details
Prof A. Arthington	in stream flows, ecology of exotic fishes, conservation of rare fishes.	Centre for Catchment & Instream Res, Griffith University, Natham Qld. 4111. Phone (07)275 7403 , Fax: (07)277 3759
Dr P. Boon	bacteriological issues, wetlands.	Environmental Management, Victoria University of Tech., PO Box 14428 MMC, Vic. 3000. Phone (03)9365 2214, Fax (03) 9365 2465. email: paul.boon@vut.edu.au
Dr A. Boulton	intermittent streams, hyporheic zones, Flinders Ranges	Ecosystem Management, University of New England, Armidale, NSW 2351. Phone (02) 67733760, Fax (02) 67732 769 email: aboulton@metz.une.edu.au
Dr M. Brock	temporary wetlands, aquatic plants	Botany Department, University of New England, Armidale NSW 2351. Phone (02)67732 578, Fax (02)67733 283 email: mbrock@metz.une.edu.au
Dr S. Bunn	stream ecology, ecology of riparian zones, biomonitoring	Faculty of Environmental Sciences, Griffith University, Nathan, Qld 4111. Phone (07)8757 407, Fax (07)875 7459, email: s.bunn@ens.gu.edu.au
Dr T. Entwisle	taxonomy and ecology of freshwater macroalgae	National Herbarium of Victoria, Birdwood Ave, South Yarra, Vic. 3141. Phone (03)96552313, Fax (03)9655 2350 email: tentwi@rbgmelb.org.au
Dr M. Finlayson	wetlands, Ramsar convention	Alligator Rivers Region, Office of Supervising Sci, Post Office, Jabiru, NT 0886 Phone (08) 89799756, Fax (08) 89792149 email:maxf@eriss.erin.gov.au
Dr T. Grant	platypus biology	Biological Science, University of NSW, PO Box 502, Cronulla, NSW 2230
K. Hortle	impact of mining, impact of development in Se Asia and PNG on rivers	Environmental Management, 18 Sharrow Road, Mitcham, Vic. 3132 Phone and Fax: (03) 9872 4101

Dr P. Horwitz	conservation of freshwater invertebrates	Dept of Science, Edith Cowan University, Joondalup Drive, Joondalup, WA 6027. Phone (08) 94055717, Fax: (08) 9300 1257 email: phorwitz@cowan.edu.au
Dr P. Humphries	fish ecology, in-stream flows	CRC Freshwater Ecology, MDFRC, PO Box 921, NSW 2640. Phone (02)6043 1002, Fax:(02)6043 1626 email: hump@watson.canberra.edu.au
Dr G. Jones	cyanobacterial blooms	Phone: 07-3896 9516, Fax: 07-3896 9525 email:gary.jones@dnr.qld.gov.au
Dr P.S. Lake	stream ecology, conservation freshwater biota	Ecology & Evolutionary Biology, Monash University, Wellington Road, Clayton, Vic. 3168. Phone (03)9055 653, Fax:(03)9055613 email: p.s.lake@sci.monash.edu.au
Dr V. Matveev	plankton food webs, biomanipulation	MDFRC, PO Box 521, Albury, NSW 2640. Phone: (060) 431002, Fax: (060) 431626.
Dr R. Pearson	tropical freshwater ecology	Zoology Dept. ACTFR, James Cook, University, Townsville, Qld. 4811. Phone:(077) 814 262, Fax: (077)79 6371
Dr W. Ponder	freshwater molluscs	Malacology, Australian Museum, 6 College Street, SYDNEY 2000 Ph: (02) 9320 6120 Fax (02) 9320 6050 Email: winstonp@amsg.austmus.gov.au
J. Puckridge	ecology of arid zone rivers, ecology of freshwater fish	CRCFE, Zoology Department, University of Adelaide, Adelaide, SA 5005. Phone (08) 83034455. Fax: (08) 8303 4364 email: jpuckrid@zoology.adelaide.edu.au
Dr N. Rea	wetland plant ecology, water regime, weeds and conservation	CSIRO Entomology, TERC, PMB44, Winellie, Darwin NT 0821 Phone (08) 8922 1717, Fax: (08) 8922 1714, email: naomi@terc.csiro.au
Dr R. Shiel	planktonic & littoral microfauna, billabong ecology.	MDFRC, PO Box 921, NSW, 2640. Phone (02)60431002, Fax: (02)60431626 shielr@mdfrc.canberra.edu.au
Dr L. Townley	: groundwater-surface water interaction.	CSIRO Division of Water Resources, Private Bag, Wembley, WA 6014 Phone (08) 9387 0329, Fax: (08) 93878211
Prof. W.D. Williams	Salt lakes	Zoology Dept, University Adelaide, Adelaide SA 5005. Phone (08) 8303 4455, Fax: (08) 83034364

BIBLIOGRAPHY

Please send details or copies of books, chapters, articles, periodicals, monographs, reports, newsletters, videos and CD's to Russ Shiel, MDFRC, PO Box 921, Albury, NSW 2640. Go on, do it..... see your name in print.....

ΛSL

Australian Society for Limnology Inc.

Membership Subscription Rates
for the year July 1997 to June 1998

Send payment to:
22 Netherby Ave
Mulgrave,3170
Australia

Member	$35.00	-------
Student Member	$17.50	-------
10 Years	$325.00	-------

Method of Payment:

Cheque☐ Money Order☐ Credit Card☐

Please debit my;
Bankcard ☐ Visacard ☐ Mastercard ☐

Card Number: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Amount: $ _____ Expiry Date: _____
Name of cardholder_____
Signature: _____

Student Declaration:

I am a full time Student at: _____
Signed: _____
Student status confirmed by Supervisor: _____
Signed: _____ Date: _____

Retain for your records:

Date paid_____amount_____Cheque__Money Order__Credit Card__

Australian Society for Limnology Inc 1997/98

Australian Society for Limnology Inc.

ASL Membership Information

Surname: ----------

Given Name(s) ----------

Title: ----------

Position: ----------

Department: ----------

Organisation: ----------

Address: ----------

----------Postcode:----------

Telephone: -(----------)----------Facsimile:-(----------)----------

Email: ----------

Qualifications: ----------

Limnological Interests:----------

Please tick appropriate section:

New member: **Ordinary:____** **Student:____** **10 Years:____**

Institutional:____

Member: **Upgrading ASL directory information:____**

Return this form to:

Hon.Treasurer/Membership Officer
Australian Society for Limnology Inc.
22 Netherby Ave.
Mulgrave, 3170, Australia
Phone/Fax (03) 9560 4406

REGIONAL EXECUTIVE MEMBERS 1998-99

NSW Mr Deb Nias

Qld Dr Gary Jones
CSIRO Land & Water, Sciences Centre, 80 Meiers Rd., Indooroopilly, Qld 4068
Ph: 07-3896-9516 Fax: 07-3896-9525
Email: gary.jones@dnr.qld.gov.au

SA Ms Kerri Muller, Botany Dept, University of Adelaide, SA 5005
Ph: 08-8303 4560 Fax: 08-8232 3297
Email: kmuller@botany.adelaide.edu.au

WA Dr Jenny Davis,
School of Environmental Sciences, Murdoch University, Murdoch WA 6150
Ph: 08-9360 2939 Fax: 08-9310 4997
Email: davis@essun1.murdoch.edu.au

ACT Dr Ralph Ogden
Dept. of Applied Science, University of Canberra, PO Box 1, Belconnen ACT 2616
Ph: 02-6201 2033
Email: ogden@science.canberra.edu.au

NT Ms Ruth O'Connor
School of Biological Sciences, Northern Territory University, Darwin NT 0909
Ph 08-8946 6761 Fax 08-8946 6847
Email: r_oconnor@banks.ntu.edu.au

VIC Ms Rhonda Butcher
Dept. Ecology & Evolutionary Biology, Monash University, Clayton, VIC 3168
Ph: 03- 9905 5643 Fax: 03-9905 5613
Email: rhonda.butcher@sci.monash.edu.au

Tas Jean Jackson
118 Wentworth Street, South Hobart, Tas 7004
Ph: 03-62237133 Fax: 03-62237133 Email: Jean.Jackson@utas.edu.au

EDITORIAL ADDRESS

Till December 1998
Dr Fran Sheldon, Dept. Zoology, University of Adelaide, SA 5005
Ph: (08) 8303 5565 Fax: (08) 8303 4364 Email: fsheldon@zoology.adelaide.edu.au
After December 1998
Dr Ivor Growns
Email: igrowns@awcnet.aw.latrobe.edu.au

SURFACE MAIL

Return to: ASL, 22 Netherby Ave, Mulgrave Vic 3170

Print Post Approved: VBG 9005906
PP381667/00125

POSTAGE PAID AUSTRALIA

Dr R. Marchant
Invertebrate Survey
Museum of Victoria
71 Victoria Cres
Abbotsford
VIC 3067